NETWORK WORLD

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SynOptics airs array of control tools

By Bob Brown
Senior Editor

BOSTON — SynOptics Communications, Inc. last week unveiled here a suite of local network management applications designed to automate data collection and analysis, as well as problem solving and routine management tasks.

By interpreting raw data and presenting it in easy-to-read formats, SynOptics' LattisWare Solutions software is designed to simplify network management by helping operators judge net performance at a glance.

The LattisWare tools run on top of SynOptics' existing LattisNet Network Manager, which is software for managing SynOptics' and other vendors' devices. LattisNet runs on either Hewlett-Packard Co.'s DOS-based OpenView net management platform or SunNet Manager, the Unix-based platform from Sun Microsystems, Inc.'s SunConnect business unit.

LattisWare combines software developed by SynOptics and third parties, including Remedy Corp., which makes a trouble-ticketing application, and Sybase, Inc., which offers SQL database software.

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PHOTO ©1992 JOHN THOMPSON

Chuck Rush (left) and Andrew Ludwick discuss LattisWare.

FCC to demote microwave users to second-class status

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The FCC last week took its first major step toward reallocating radio frequencies from microwave users to providers of emerging wireless network technologies.

The Federal Communications Commission proposed a set of rules that would demote all microwave users except public safety agencies from their current status as primary users in the 1.85-GHz to 2.20-GHz bands and set aside that spectrum for use by providers of new wireless technologies.

The proposal also limits all microwave users from expanding their current networks, although users will have a 10- to 15-year transition period before the bulk of the new rules kick in.

FCC Chief Engineer Thomas Stanley said the agency's action clears the way for new wireless services to hit the market within two to three years. Although the FCC did not specify which new technologies will be granted space in the 1.8-GHz to 2.2-GHz band, Thomas acknowledged that personal communications network (PCN) services are a primary contender.

PCN technology would enable

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NetWare users to get links to IBM E-mail

Novell tool lets MHS-based message systems swap mail with DISOSS, PROFS, OfficeVision.

By Caryn Gillooly
Senior Editor

PROVO, Utah — Novell, Inc. today is expected to unveil software that will bridge the long-standing gap between local-area network electronic mail products and IBM E-mail systems.

The software, called NetWare Messaging Connect, will enable users of any E-mail package based on Novell's Message Handling System (MHS) to exchange messages with users in IBM OfficeVision, DISOSS and Professional Office System (PROFS) environments.

This means users of some popular E-mail packages will not have to go through a third-party gateway to exchange files and messages with IBM systems. MHS-based packages include Da Vinci Systems Corp.'s E-mail Remote, E-mail for Windows, E-mail for OS/2 and E-mail for DOS; CE Software, Inc.'s QuickMail; and Beyond, Inc.'s @Mail and Beyond Mail.

"There's a large installed base of NetWare and a huge installed base of IBM, and until now, it's been hard to get the two to communicate," said Shirley Hunt, an analyst at Dataquest, Inc., a market research firm in San Jose, Calif.

NetWare Messaging Connect consists of two components: Connect/MVS for IBM mainframes

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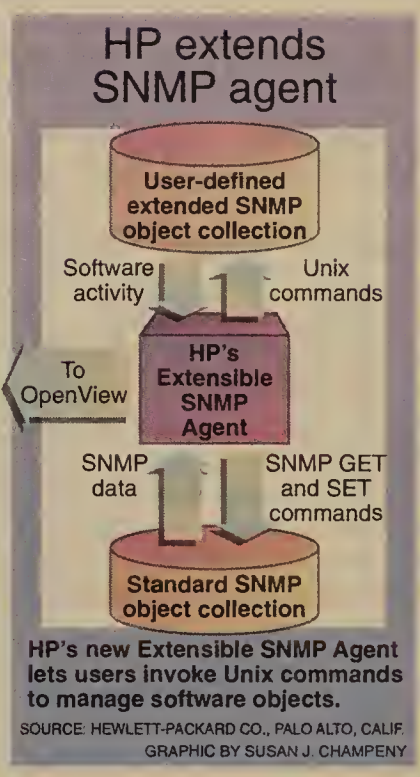

HP's new Extensible SNMP Agent lets users invoke Unix commands to manage software objects.

SOURCE: HEWLETT-PACKARD CO., PALO ALTO, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

HP extends SNMP control to software

By Joanne Cummings
Staff Writer

PALO ALTO, Calif. — Hewlett-Packard Co. this week is expected to unveil a new Simple Network Management Protocol agent that enables users of any SNMP manager to monitor applications, databases and other software as well as hardware devices.

HP's new Extensible SNMP Agent is software that resides on select HP or Sun Microsystems, Inc. Unix computers and uses custom SNMP objects to provide data on software activities or to monitor hardware not covered by existing SNMP management information bases.

Jerry Henderson, manager of national network operations at GTE Data Services, Inc. in Tampa, Fla., and an early beta user of the

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NETLINE

NEWSPAPER

FEATURE

Test shows which NOS performs best for you

By Salvatore Salamone
Features Writer

While performance is only one of many factors to consider when choosing a local-area network operating system, it is an important one in many situations.

Benchmark tests done as part of the *Network World*/Enterprise Technology Center Test Series determined which product performed best for various applications and work group sizes.

Network World/ Enterprise Technology Center NETWORK TEST SERIES

The tests put products from the three top LAN operating system vendors through a speed drill and show that, under some circumstances, one is dramatically faster.

As a basis for comparing performance, each product was tested using its default settings. Optimizing each product to match a specific application and work group size will likely improve performance.

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Firm to air object tools for application development

HyperDesk's DOMS object-based software to ease task of developing client/server applications.

By Joanne Cummings
Staff Writer

SAN FRANCISCO — HyperDesk Corp. is expected to unveil at this week's Uniforum Conference and Trade Show here a suite of developers' tools that make it easier to build client/server applications for use across a heterogeneous network.

The company's new Distributed Object Management System (DOMS) will enable developers to build distributed applications that let a user access data from several different machines across an enterprise network and integrate it into a single document.

HyperDesk's DOMS tools are the first to comply with the Object Management Group's (OMG) Object Request Broker (ORB), which is a standard communications mechanism that establishes links between client applications and software objects residing on different network nodes. Objects are pieces of software that can be reused in different applications, obviating the need for developers to rewrite the code each time they need it.

As part of the announcement, HyperDesk said several independent software vendors, including Constellation, Inc., IXI, Ltd., NetWise, Inc. and Uniplex Integration Systems, Inc., plan to incorporate DOMS in future re-

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Motorola plans to fold SNA traffic into LAN backbone

Cisco's revised SNA plan makes project feasible.

By Maureen Molloy
Staff Writer

SCHAUMBURG, Ill. — Motorola, Inc. last week said Cisco Systems, Inc.'s new plan for supporting IBM Systems Network Architecture data on a multiprotocol backbone will enable it to fold its SNA traffic into a nationwide LAN internetwork.

Motorola, which is Cisco's largest customer, told the vendor months ago to focus its efforts on supporting only key SNA properties, rather than attempt to deliver the full set of capabilities found in IBM front-end processors.

As a result, Cisco last week said it was backing off from its original plan to enable its routers to support SNA in native mode. Instead, the company will develop limited PU Type 4 capabilities that will better enable its routers to transport SNA traffic over multiprotocol backbones ("Cisco to flesh out SNA routing strategy, *NW,* Jan. 13).

"Cisco's [new] approach solves all the problems that, to date, IBM has no solution for," said Dan Simone, a network engineer for Motorola's Land Mobile Products Sector who is beta-testing Cisco's new software. "It makes it possible for us to really start aggressively moving our SNA devices onto our router internetwork backbone."

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Ascom Timeplex unveils line of SONET-based muxes

By Paul Desmond
Senior Editor

WOODCLIFF LAKE, N.J. — Ascom Timeplex, Inc., formerly Timeplex, Inc., last week announced a family of SONET-based multiplexers and outlined its role in the Ascom Group's new Enterprise Networks Division.

The division, which will sell primarily to corporate users, will include Ascom Group subsidiaries specializing in net management applications and power supplies. The IN-NET subsidiary, which makes X.25 and Fiber Distributed Data Interface products, has been consolidated into Ascom Timeplex. Ascom Group purchased Timeplex from Unisys Corp. last year.

At the press conference introducing the new division, Ascom Timeplex took center stage with the unveiling of its Synchrony Service and Transport System (STS) family of muxes, which are based on the Synchronous Optical Network standard and its European counterpart, Synchronous Digital Hierarchy (SDH). The muxes will support traditional time-division multiplexing (TDM) technologies, along with frame relay, Asynchronous

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Briefs

IBM to air NetWare on AIX, router. IBM this week is expected to fulfill a statement of direction it made last February by announcing an AIX version of Novell, Inc.'s NetWare, according to sources familiar with the company's plans. The software will be compliant with NetWare Version 3.11 and run on AIX Version 3.2, which will also be announced this week. It was unclear when the software will be available, although sources said it could be as soon as April.

IBM will also provide further details on its multiprotocol router, dubbed the IBM 6611 Network Processor. When it ships in June, the router is expected to support frame relay, Transmission Control Protocol/Internet Protocol, Novell's Internetwork Packet Exchange (IPX), Xerox Corp.'s Xerox Network Systems and Digital Equipment Corp.'s DECnet protocols.

Another release, due in September, will add support for Apple Computer, Inc.'s AppleTalk. Support for IBM's Advanced Peer-to-Peer Networking Network Node will be announced as a statement of direction, although the sources expect it to be delivered by the end of this year or early 1993.

IBM is expected to announce two models of the 6611, which will be based on IBM's RISC System/6000. IBM will offer a four-port Model 140 and seven-port Model 170. The company will provide dual-port T-1 interface boards and single-port local-area network adapters.

Pricing for the 6611 has not been finalized, but it is expected to start around $10,000, with the adapter boards costing $3,000 each.

RBHCs seek to overturn ban. Lawyers for the seven regional Bell holding companies last week filed a brief with the U.S District Court of Appeals in Washington, D.C. to introduce evidence in support of the court overturning a prohibition in the Modified Final Judgment.

The RBHC filing argues that an MFJ prohibition on transmission of out-of-band Signaling System 7 data across local access and transport area boundaries should be set aside due to a U.S. Supreme Court ruling last week in the so-called Suffolk County, Mass., "Rufo" jail case. In that case, the court ruled that modification of a consent decree may be warranted when "changed factual conditions" make compliance more difficult or unworkable and when "enforcement of the decree would be detrimental to the public interest."

Bellcore issues SMDS plan. Bell Communications Research last week proposed a specification for linking interexchange, local and international Switched Multimegabit Data Service (SMDS) networks. The plan is designed to guard against the emergence of SMDS islands, according to a Bellcore spokesman.

The document, "TR-TSV-001060, Switched Multimegabit Data Service Generic Requirements for Exchange Access and Intercompany Serving Arrangements," presents Bellcore's view of the basic requirements for Exchange Access SMDS. Implementation is expected by year end.

Wall Street builds hot site. A consortium of 14 New York financial services firms last week awarded a contract to start-up Contingency Trading Facility, Inc. (CTF) to build a hot backup sales and trading facility in Brooklyn, N.Y. The terms of the contract were not disclosed.

The Disaster Recovery "Hot Site" Consortium, which comprises New York banks and brokerage houses, formed in 1989 to investigate ways to provide disaster recovery services for their firms at minimal cost. The hot site built by CTF will be equipped with computer and telephone equipment capable of simultaneously supporting 250 traders.

Comdisco plans voice service. Comdisco Disaster Recovery Services, Inc. last week said it will use Northern Telecom, Inc. private branch exchanges to offer so-called voice recovery services through Comdisco centers in Chicago, Los Angeles, New York and San Francisco beginning this spring. The services will enable telemarketers and other users to relocate to the temporary facilities in the event of an outage.

Under the arrangement, Comdisco will install large Meridian 1 PBXs at the four centers, equip them with the latest operating software and configure them to support features requested by Comdisco customers. Comdisco plans to offer voice recovery services through 20 centers nationwide in the next two years.

CONTENTS

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Bellcore unveils RBHCs' ISDN deployment forecast

Bell Atlantic leads charge with aggressive plan.

By Ellen Messmer
Washington Correspondent

LIVINGSTON, N.J. — Bell Communications Research last week released its long-awaited report on the RBHCs' five-year Integrated Services Digital Network deployment plans.

The report, which contains the most consolidated and detailed information ever made available concerning the seven regional Bell holding companies' ISDN plans, reveals that Bell Atlantic Corp. has the most aggressive approach to ISDN, while Southwestern Bell Corp. trails well behind the pack.

Bellcore's "ISDN Deployment Data, Issue 1" report, assembled with RBHC cooperation, was originally scheduled to be released in October. It shows that 37.9% of Bell Atlantic's 18.2 million access lines were already ISDN-capable last year. By the end of this year, 78% of Bell Atlantic customer lines will support ISDN (see graphic, page 54).

In contrast, only 8% of Nynex Corp. lines supported ISDN in 1991, although the carrier intends to increase that percentage to 25% this year. However, Nynex will only have 33% of its lines ISDN-capable by 1995.

Southwestern Bell turned in the least ambitious deployment schedule, expecting only 16% of its lines to be ISDN-capable this year and about the same percentage by 1995.

With the exception of Southwestern Bell, the percentage of lines to be ISDN-capable by 1995 were "good" in terms of realistic expectations, according to Ian Angus, president of Pickering, Ontario-based Angus TeleManagement Group, Inc.

But Jim Briggs, senior engineer at Eastman Kodak Co. in charge of ISDN planning, said the RBHC plans do not go far enough in comparison to Japan and France, where ISDN deployment is essentially complete.

Briggs said the report's detail, however, is excellent for strategic planning. "We've been asking for this kind of information for years," he added.

He also pointed out that the plans are not set in stone. "It remains to be seen whether the Bell companies will deliver on their promise," Briggs said.

The report, which will be updated by Bellcore every six months or so, contains extensive data on cities and Bell facilities where ISDN switch upgrades will be made. Some information on tariff filings made by the RBHCs for ISDN is also covered.

Stan Kluz, data communications engineer at Lawrence Livermore National Laboratory and

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We want to hear from you. *Network World* has set up a toll-free number you can use to leave news tips or letters to the editor. Let us know what's going on or how you feel about the stories you read in our publication. Call (800) 622-1108 and ask for Ext. 487.

MAXM upgrade bolsters automated mgmt. facilities

By Paul Desmond
Senior Editor

VIENNA, Va. — International TeleManagement (ITM) last week announced a new version of its MAXM integrated net management system that features enhanced automation facilities, including the ability for IBM's NetView to trigger the execution of programs that resolve problems.

Version 2.0 of MAXM includes a fivefold improvement in the execution speed of automation routines plus support for event-driven automation, which allows the system to automatically respond to network alarms and events.

MAXM is an IBM RISC System/6000-based net management system that integrates the monitoring and control of element management systems from some 70 vendors. It uses IBM Personal System/2s as management consoles and supports a bidirectional interface to IBM's NetView, a feature developed with the help of IBM. ITM is an IBM Business Partner.

Craig Thompson, senior vice-president of marketing at ITM, said the company optimized the code for MAXM automation scripts to achieve the speed increase over the September 1991 version. He said the routines run about 10 times faster than the original version of MAXM, which is important for large networks in which MAXM has to poll thousands of devices.

The automation scripts are built by users with the help of on-screen fill-in-the-blank forms. The forms are based on the Open Software Foundation, Inc.'s Motif graphical user interface (GUI) and require no programming skills, Thompson said. The scripts execute predefined commands to perform routine tasks, reset devices or request information from attached systems or devices.

Another enhancement in Version 2.0 lets automation scripts be triggered by NetView or by alarms and events that MAXM receives from attached element managers. That allows the system to, for example, automatically reroute traffic around a failed T-1 link or disable a failed private branch exchange port, Thompson said. Previously, the scripts

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User says switched 384 service exceeds expectations

By Bob Wallace
Senior Editor

STAMFORD, Conn. — General Electric Capital Corp., which began testing AT&T's switched 384K bit/sec service in November, said the offering has exceeded expectations and the carrier's service performance standards.

The company is using the service for local-area network interconnection, videoconferencing and disaster recovery applications between its data center here and a similar site in Atlanta.

"The overall performance of the service has been excellent," said Greg Casagrande, GE Capital's enterprise network manager. "And every time we've gone to use it, the facility has been available."

AT&T's Accunet Switched 384 service enables users to establish a dial-up 384K bit/sec digital link as needed to support high-capacity applications. The service is available in more than 150 cities and complements the carrier's existing switched 64K and 1.544M bit/sec services.

In November, GE Capital began testing the AT&T switched 384 service to back up fractional T-1 links used to tie 4M bit/sec IBM Token-Ring Networks here and in Atlanta.

The company also used the AT&T switched 384 service in place of two switched 56K bit/sec links in a videoconferencing application connecting PictureTel Corp. videoconferencing systems in the same sites.

In a bandwidth-on-demand application, the 384K bit/sec switched link was kept up for an entire day to support bulk file transfers during the recent holiday shopping season without any problems, Casagrande noted.

GE Capital said it has averaged only six severely errored seconds a day since it began testing the service in November, far better than AT&T's performance standard, which guarantees that the number of severely errored seconds will not exceed 22 a day.

AT&T's service specification promises that the percentage of error-free seconds will not fall below 99.82%. GE Capital found that the switched 384K bit/sec link boasted an average of 99.9% error-free seconds.

The company was also able to establish the switched 384K bit/sec circuit faster than expected. AT&T said the link would take an average of four seconds to set up, while GE Capital found that setup time averaged three seconds.

GE Capital expected some call blocking during peak business hours, even though AT&T's service guarantee says blockage will not exceed 1%. But the company has encountered no blocking since it began using the service.

Costwise, Casagrande said that by using its Tariff 12 custom network arrangement, the company was able to whittle more than 40% off the tariffed rate for the service.

Although the company would like to further deploy the service, usage will hinge on the proximity of AT&T Integrated Services Digital Network points of presence to GE Capital sites, Casagrande said. The service has to be accessed using ISDN Primary Rate Interface (PRI) links. "The recurring costs for ISDN PRI lines can be quite high," Casagrande said.

The switched 384 test will conclude next month.

GE Capital reports on AT&T's Accunet Switched 384 service

AT&T's guaranteed service level	GE Capital's service experience
Less than 22 severely errored seconds per day	6 severely errored seconds per day
99.82% error-free seconds	99.90% error-free seconds
4-second circuit setup	3-second circuit setup
1% blockage at peak hours	No blockage during peak hours

SOURCE: GENERAL ELECTRIC CAPITAL CORP., STAMFORD, CONN.
GRAPHIC BY SUSAN J. CHAMPENY

Microsoft enhances SQL Server, widens data access

Offers database gateways, development tools.

By Timothy O'Brien
West Coast Bureau Chief

SAN FRANCISCO — As expected, Microsoft Corp. last week announced a major upgrade of its SQL Server database server, as well as related tools for client/server application development and gateways for wider database connectivity.

As part of the announcement, Microsoft introduced a Windows-based management tool to ease administration of SQL Server installations, along with Open Data Services (ODS), a tool kit for building links from SQL Server to outside data sources.

Microsoft Chairman Bill Gates, on hand for the announcements at the company's first SQL Server Week here, explained that the server's new connectivity enhancements and other features expand its role in Microsoft's strategy of making Windows the access point for data across an enterprise net.

"We are giving users more flexibility in terms of database access and enterprise connectivity," Gates said. "Only by using the client and server together can we get the best of both worlds."

SQL Server Version 4.2 adds features based on Sybase, Inc.'s SQL Server Version 4.2, such as server-to-server remote procedure calls to improve distributed data management, disk mirroring and cascading triggers — event-driven stored procedures that can be set off in sequence.

Microsoft went the extra step and added a client-based scrollable and updatable cursor capability, providing a new way to manipulate row-level data ("New OS/2 SQL Server seeks parity with Unix cousin, *NW*, Jan. 13).

Version 4.2 also includes SQL Administrator for Windows, which allows users to configure, tune and back up multiple SQL Servers from a single Windows-based workstation.

Another new feature in SQL Server is the ODS tool kit, which enables users to develop custom event-driven server applications that extend access to host information systems, messaging systems and other data sources.

The tool kit may be used, for example, for developing an application that could be invoked by SQL Server to automatically transmit a reorder request to a host-based order-entry system if

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US West teams up with Ascend to offer videoconferencing service

By Bob Brown
Senior Editor

US West Communications, Inc. has signed an OEM agreement with Ascend Communications, Inc. that will enable the local carrier to roll out a bandwidth-on-demand videoconferencing service, *Network World* has learned.

The service, called MediaConferencing, will be a turnkey offering that bundles US West Communications switched services with inverse multiplexers from Ascend and video coder/decoders from VideoTelecom Corp., which previously had an OEM agreement with US West Communications.

Using the Ascend gear, users will be able to dial up multiple switched 56K or 64K bit/sec digital links to support videoconferencing.

The service, which will be demonstrated this month at ComNet in Washington, D.C., will also enable users to exchange graphics on a second screen. That capability is supported by a new graphics feature developed by VideoTelecom.

Pricing for the MediaConferencing service will be announced in February, according to Steve Roth, US West Communications' director of customer premises equipment product management.

According to David Helfrich, Ascend's vice-president of marketing, the service is more than just an OEM agreement. The Bell operating companies are threatened by long-haul carriers' high-speed switched and frame relay services that offer bandwidth on demand. MediaConferencing could help avert bypass, he said.

"This marks the first bandwidth-on-demand offering by a Bell operating company," Helfrich said. "1991 was the year the

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NetWare users to get links to IBM E-mail

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and Connect/LAN for NetWare 2.2 or 3.11 servers. To exchange messages, the components establish an LU 2 session using Novell's NetWare for SAA, a NetWare Loadable Module that can support either token-ring or Synchronized Data Link Control ties to a host.

Users in LAN environments generate messages using whatever E-mail system they have installed. The MHS engine will automatically recognize the messages bound for an IBM system and hand them off to the NetWare Messaging Connect software. The system then does the necessary address mapping and format translations and invokes the logical unit session.

The same is true in the reverse. IBM's Systems Network Architecture Distribution Services (SNADS) transport protocol will recognize messages bound for MHS-based nets and perform the appropriate address mapping and translation.

According to Hunt, LAN E-mail and IBM E-mail users cannot currently exchange messages unless the LAN users have separate mail accounts — one for the personal computer mail system and one for the IBM mail system. And users cannot toggle between the two accounts. To get from one to the other, she said, the user has to exit the PC mail program and establish a terminal-emulation session with the mainframe.

Some vendors offer a gateway to IBM's SNADS, but this new software provides far more capabilities, Novell said. "An SNADS gateway doesn't let you communicate with PROFS," said Phil Schacter, product manager for NetWare Messaging Connect. "[NetWare Messaging Connect] also goes further than a gateway by understanding addressing and routing."

According to Novell, the other primary advantage of the software is that it lets customers use an SNA backbone to send information throughout the enterprise, either to IBM-based environments or to other LANs connected to the same corporate net.

Jamie Lewis, vice-president at The Burton Group, a Salt Lake City consulting firm, was more skeptical about the differences between this product and a gateway, but he agreed that it has potential.

"It's a good idea and something Novell has needed for a while," he said. "But directory synchronization capabilities are needed to differentiate it from a gateway."

Schacter said this first release does not have directory synchronization, which is the ability for the system to automatically add and delete users from IBM mail directories when they are added or deleted from the Novell directory. He said the firm is working on adding that process, though he declined to be more specific about when that capability may be available.

Analysts speculated that Novell was able to develop this product due to its new relationship with IBM. According to Hunt, IBM has always been very closedmouthed regarding details about SNA.

"You couldn't do this before because there wasn't enough information available about [the workings of] SNA," she said. "IBM would have had to release information about SNA [to Novell] for Novell to do this."

NetWare Message Connect will be available next month for $24,995. The package includes Connect/MVS and one copy of Connect/LAN. Additional copies of Connect/LAN will cost $2,495 each.

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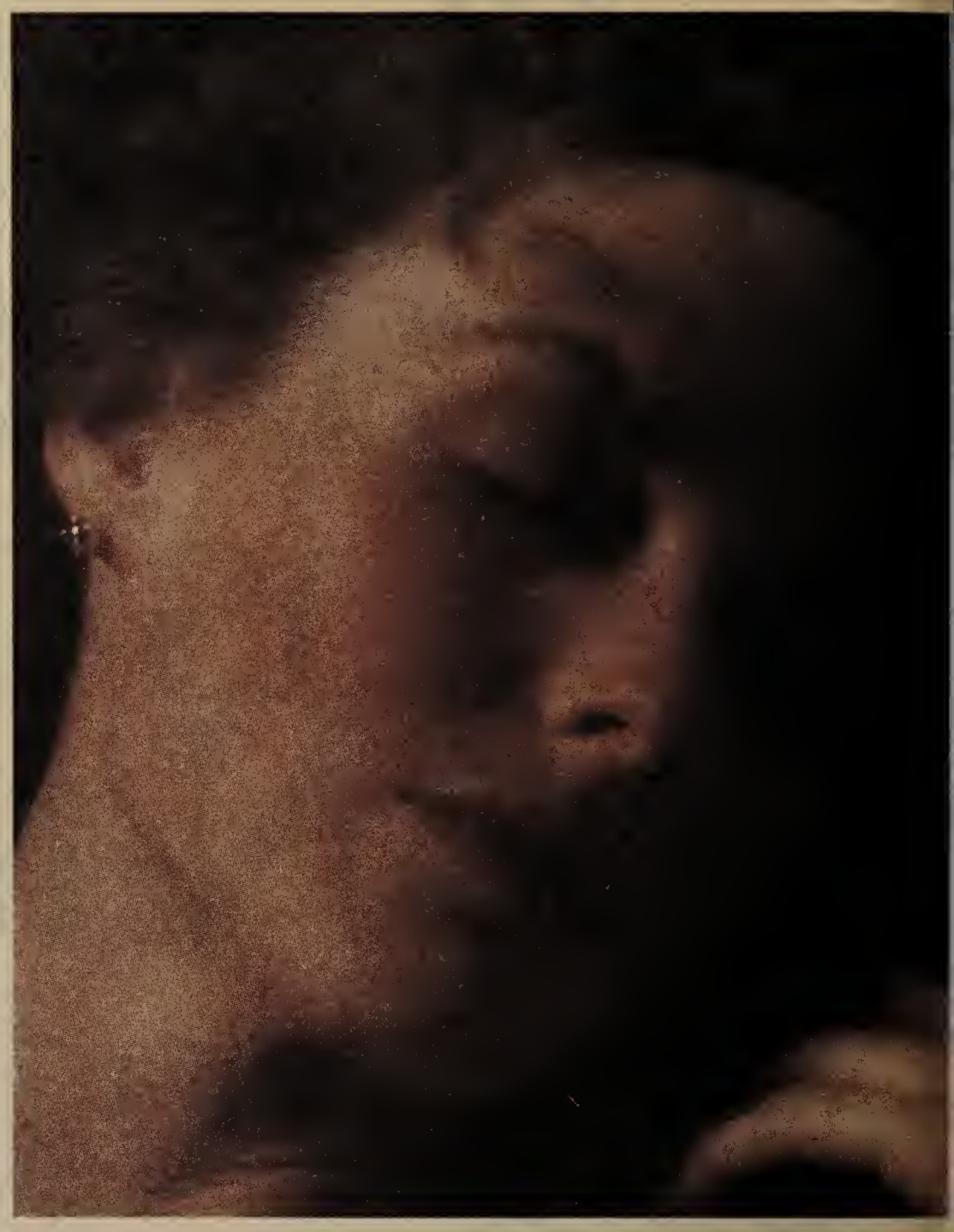

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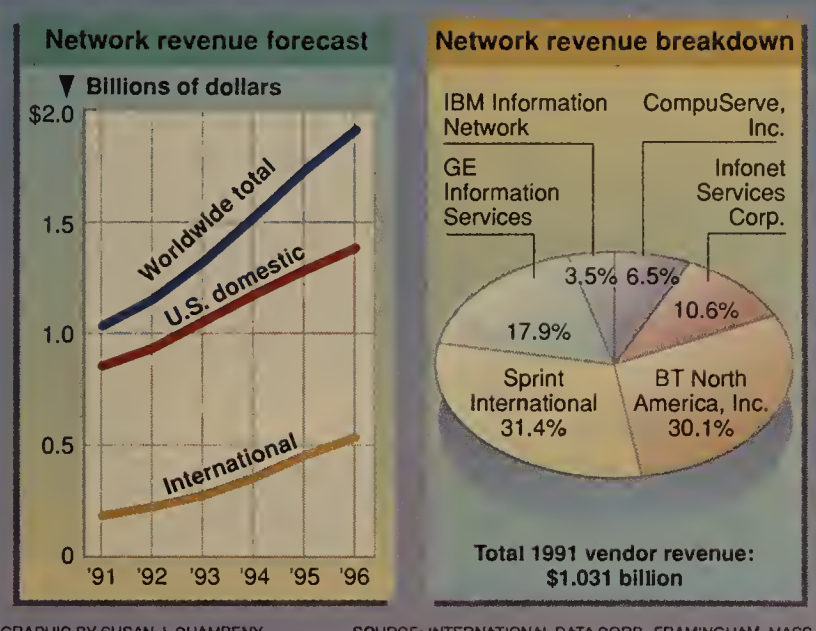
Worth Noting

"More than three-quarters of the money being spent by vendors on network management is on applications development."

Jim Herman
Principal
Northeast Consulting Resources, Inc.
Boston

Value-added net market snapshot



GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Carriers to connect frame relay services

Despite obstacles, local and interexchange carriers feel one another out to unite emerging offerings.

By Paul Desmond
Senior Editor

Carriers entering the nascent frame relay service market are already thinking about one of the next steps in the evolution of the service: interconnecting their respective frame relay nets.

The carriers agree that the challenges in that effort, while not insurmountable, are numerous. They include the current lack of a network-to-network standard for frame relay, plus differences in how various carriers implement the service with respect to features such as committed information rate (CIR).

Some carriers expect that billing could also emerge as an issue, along with the passing of network status data between nets in order to deal with congestion, for example.

The push for interconnection is expected to come between interexchange carriers and the regional Bell holding companies, as well as between domestic long-haul carriers and their counterparts overseas. Interexchange carriers do not expect users to demand links between their long-haul nets, although most said they are open to that possibility.

"We are basically trying to establish a connection with any other carrier that wants to establish one for test purposes," said Robert Gourley, engineering manager for WilTel's WilPak frame relay service. "We'd consider testing with other [interexchange carriers]."

In October, WilTel announced that it was testing a frame relay link between its laboratory in Tulsa, Okla., and a Nynex Corp. test lab in White Plains, N.Y. Then last week, Gourley said WilTel is working on another link to a Southwestern Bell Corp. laboratory and has had discussions about conducting tests with US West, Inc.

The current internetwork links are unintelligent, he said,

(continued on page 22)

People & Positions

Telebit Corp., a Sunnyvale, Calif., data communications equipment maker, last week announced the appointment of **Michael Ballard** as president and chief executive officer.

Ballard has been with Telebit for more than six years and most recently was the company's vice-president of business development. He was involved in the company's efforts to support Unix in its modems.

Ballard replaces **Lewis Ellmore,** who resigned in October.

Metropolitan Fiber Systems, Inc., an Oakbrook Terrace, Ill., alternative access carrier, recently named **Al Fenn** as president of the company's new **Datanet, Inc.** subsidiary.

Previously, Fenn was vice-president of business development and planning for BT North America, Inc.

Datanet was formed to develop and market advanced data services.

Network General Corp., a Menlo Park, Calif., local-area network analyzer maker, recently announced the retirement of **George Comstock,** the company's vice-president of business development.

Comstock joined Network General in November 1986 as vice-president of sales and marketing and was named head of business development in 1988. In that position, he was responsible for identifying and developing new business opportunities.

SCO, Novell to devise links between Unix, NetWare

Goal is to offer NetWare access to Unix programs.

By Ellen Messmer
Washington Correspondent

SANTA CRUZ, Calif. — The Santa Cruz Operation, Inc. (SCO) last week said it will team with Novell, Inc. to develop a line of products to better integrate users of its Unix operating systems into NetWare environments.

Products resulting from the agreement will enable NetWare users utilizing DOS and OS/2 personal computers to access more than 3,000 Unix programs — including client/server applications as well as databases — supported by SCO's operating systems.

SCO customers also will be able to use systems supporting SCO Unix and SCO Open Desktop as NetWare clients in order to access data, applications and resources residing on NetWare servers via the Transmission Control Protocol/Internet Protocol and Network File System.

The first product, called SCO IPX/SPX, will allow MS-DOS client computers attached to a server running Novell's Portable Netware to access a Unix-based computer, SCO officials said.

According to the agreement, SCO has licensed Novell's Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) transport protocol so SCO software developers can port the Novell IPX protocol to the SCO Unix System V operating system and SCO Open Desktop. The latter is a package consisting of a Unix operating system, graphical user interface and database management system.

Dipak Basu, SCO product marketing manager for networking products, said the agreement enables his company to develop software in-house to work between NetWare and Unix System V or Open Desktop.

SCO IPX/SPX is expected to be available by midyear and will be sold as an optional add-on to the SCO Unix offerings.

As the next step, Basu said SCO intends to develop software that allows Unix computers to act as clients to NetWare servers through direct access over Novell's IPX/SPX protocol.

> The agreement enables SCO to develop software in-house to work between NetWare and Unix System V or Open Desktop.
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Officials at SCO last week emphasized that the connectivity pact with Novell was the start of a long-term strategy to provide greater levels of integration between SCO Unix and NetWare.

Basu said the companies will work on developing three types of products to link SCO and NetWare users: Telnet terminal emulation for logging on to a Unix host, a TCP/IP gateway between a host running SCO Unix and a NetWare server, and dual-protocol stacks using TCP/IP and IPX in a PC.

INDUSTRY BRIEFS

NCR to market NetWare. NCR Corp. last week said it has signed a $15 million agreement with Novell, Inc. to resell shrink-wrapped versions of the NetWare operating system.

The arrangement is similar to the one struck between IBM and Novell almost a year ago in which IBM sells off-the-shelf versions of NetWare. Under the new agreement, NCR will sell NetWare Versions 3.11 and 2.2 along with its own systems and networking products, said Gary Derlinger, director of systems integration in NCR's Customer Services Division.

NCR was one of the first licensees of Novell's Portable NetWare, a C language source-code version of the ubiquitous local-area network operating system, and is currently shipping that implementation on its Motorola, Inc. 68000-based Tower processors. The company is also shipping a version of Portable NetWare, called NetWare/X, on its Intel Corp.-based System 3000 platforms.

NetWare 3.11 and 2.2 are available now from NCR.

Cable & Wireless buys Wangpac. Cable & Wireless Communications, Inc. recently acquired the Network Services division of Wang Information Services Corp. for $11 million. Analysts said the move transforms Cable & Wireless into a serious player in the public X.25 services market. The Wang division operates Wangpac, a global packet net based on Bolt Beranek and Newman, Inc. packet switches in 28 U.S. cities, as well as Australia, Belgium, France, Hong Kong, Ireland, the Netherlands, Spain, Sweden, Switzerland and the U.K.

According to Cable & Wireless President Al Peyser, the carrier plans to integrate Wangpac with its existing network of Northern Telecom, Inc. packet switches in seven U.S. cities. The Northern Telecom network will replace many of the 56K bit/sec private lines currently used to link Wangpac switches.


5
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*DATAQUEST INC. (a Dun and Bradstreet Company), Score Report: Customer Satisfaction – PBX Systems; November 1991

Worth Noting

The European market for telecommunications equipment rose from $30 billion in 1990 to $33.1 billion last year, according to a recent report by Frost & Sullivan, Inc., a New York research firm. Germany, with 20% of the 1991 market, edged out France, which accounted for 19%.

Carrier Watch

AT&T recently won a four-year, multimillion-dollar contract to provide Worldspan Travel Agency Information Services with a Software-Defined Network that will support the firm's voice traffic.

The SDN will initially link 227 Worldspan sites to the company's corporate headquarters in Atlanta but may be expanded to serve sites outside the U.S. Although Worldspan has long used AT&T calling services, AT&T was not the company's primary carrier until the SDN contract was signed.

Worldspan offers reservations, ticketing and office automation products to the domestic and international travel industry.

Metropolitan Fiber Systems, Inc. (MFS) last week announced it has begun to expand its Chicago network to serve 53 new buildings, bringing the number of structures served by its all-fiber bypass net to 100.

The MFS network in Chicago will now reach north to Ontario Street, south to Jackson Street, east to Park Drive and west to Wacker Drive.

The expansion will enable users outside the Chicago loop to access alternative access, private-line, video and E-1 services. MFS expects to have the new portion of the network on-line next month.

(continued on page 15)

One man's view of local-loop competition

Robert Annunziata, president and CEO of Teleport, recently said that true competition in the local loop is only possible if LECs agree to:

- Unbundle local-loop services.
- Allow alternative carriers to connect their networks to LEC central offices.
- Offer local telephone number portability.
- Give equal access to alternative carrier switches in LEC Signaling System 7 nets, tandem switching systems and local traffic routing plans.
- Terminate local calls originating on alternative carrier networks.
- Pay alternative carriers for terminating calls originating on LEC nets.
- Coordinate engineering, operations and maintenance, as well as administrative practices and procedures.

LEC = Local exchange carrier

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: TELEPORT COMMUNICATIONS GROUP, NEW YORK

PacBell outlines plans for new switched 56K service

Offering to support LAN interconnection, video.

By Bob Brown
Senior Editor

SAN FRANCISCO — Pacific Bell recently unveiled plans for a new switched 56K bit/sec digital service designed to support local-area network interconnection, videoconferencing and other emerging applications.

Availability of Pacific Bell's Switched Digital Service (SDS) 56 would enable users in the carrier's coverage area to plan for end-to-end switched digital service by combining local and long-haul switched offerings.

The service will also provide users with an alternative to private lines, which typically are more expensive, and low-speed analog lines equipped with modems.

> Availability of SDS 56 would enable users to plan for end-to-end switched digital service.
>
> ▲▲▲

Previously, the carrier has offered Cenpath, a switched 56K bit/sec option to its Centrex service, and Centrex Integrated Systems, an Integrated Services Digital Network service. Compared to these switched services, the proposed SDS 56 offering provides several advantages, said Steven Haggerty, director of switched 56K bit/sec service development for the carrier's Data Communications Group.

When available, SDS 56 will be accessible to users more than two miles from a central office, a feature not available with the carrier's existing switched services, he said.

Secondly, the service can be offered from any Pacific Bell central office, even those with older switches, such as sites housing AT&T's 1AESS switches, Haggerty said. Finally, the service allows "casual dialing," whereby users can dial through Pacific Bell's service into any long-haul carrier's switched network at any time.

"One of the primary goals of the product was to find a way to provide the service to a much larger base than we can currently provide ISDN or Cenpath services to," Haggerty said.

Pacific Bell plans to begin offering SDS 56 in the spring. However, the carrier is awaiting approval on the service from the California Public Utilities Commission.

The new service will be deployed initially in the largest metropolitan areas within Pacific Bell's region, such as San Francisco and Los Angeles, and then expanded to outlying areas.

The carrier has not yet filed a formal tariff outlining rate information on the service.

The switched 56K bit/sec service is not designed to replace ISDN, which Pacific Bell plans to roll out statewide, Haggerty said. The carrier encourages users served by ISDN-ready central offices to use ISDN if it is available since the service offers users two channels instead of the one offered via the new switched 56K bit/sec service.

However, because new

(continued on page 15)

AT&T to upgrade PBX ISDN interface

Definity Generic 3 will enable customers to make better use of 12-port Basic Rate Interface cards.

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — The AT&T Definity Generic 3 private branch exchange to be announced at the ComNet conference here next week will support an ISDN feature that gives users greater flexibility in configuring channels.

The feature will enable users of 12-port Basic Rate Interface (BRI) PBX cards to support voice or data on each of the 2B+D bearing channels, whereas the older version restricted voice support to one channel per BRI channel.

"The feature gives customers more flexibility in configuring ports and saves them money by enabling them to utilize the entire capacity of each port card," said Allan Sulkin, president of TEQ-Consult Group, a Hackensack, N.J., consultancy.

AT&T confirmed plans to announce the feature but declined to discuss it further.

With BRI, a single telephone link supports two 64K bit/sec B channels for voice and data communications and one 16K bit/sec D channel for signaling information and packetized data.

The company's existing 12-port Integrated Services Digital Network BRI card supports 12 separate BRI ports, and customers can use one B channel for voice and the other for data. This means that a single BRI card can support as many as 24 devices. But no more than 12 ports can be used at one time to support voice. The same applies to data.

With the new feature, each of the 12 BRI ports can support voice on both B channels, if needed. This gives users two voice devices or two data devices per port on the card. A single card would still support 24 devices.

Good job

Analysts applauded AT&T's plan to offer users the feature.

"Before, you were restricted to 12 voice devices and 12 data devices," Sulkin said "But with the new feature, users can have any mix of voice and data devices. They could have 24 of one and zero of the other."

In the future, the Generic 3

(continued on page 15)

WASHINGTON UPDATE

BY ANITA TAFF

Debating AT&T's dominance. While vocally criticizing the Federal Communications Commission for refusing to allow changes to most Tariff 12 deals, AT&T continues to oppose an FCC order that would give users the chance to cancel their custom net plans once 800 numbers become portable.

The FCC concluded in August that AT&T is dominant in the 800 service market because it has 80% of the market and users cannot switch carriers and retain their numbers. So it voted to bar AT&T from bundling 800 service in any new Tariff 12 or contract deal after Aug. 1. The FCC has also been restrictive in allowing changes to existing Tariff 12 deals with 800 service.

The FCC's prohibitions will be lifted once 800 numbers are portable, which is scheduled for March 1993. In an effort to make sure that users would not be locked into the long-term Tariff 12 deals and, therefore, unable to take advantage of the benefits of 800-number portability, the FCC said that users will have a limited period to cancel their Tariff 12 deals and obtain service elsewhere with no penalty. AT&T has asked the FCC to reconsider that decision and to eliminate that option. The carrier complained that the agency did not give AT&T advance notice that such a provision was under consideration and that the FCC is improperly trying to impose rules on AT&T's tariff.

User groups such as the Ad Hoc Telecommunications Users Committee, the California Bankers Clearing House Association, the New York Clearing House Association and the American

(continued on page 15)

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Both services offer such features as unified billing of your U.S. charges, flexible network usage reports, centralized work centers for domestic maintenance and installation, and AT&T's tradition of customer service. And both of them can save you anywhere from 5-40%.

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PacBell plans for switched 56K service

continued from page 13

switched 56K bit/sec service is less expensive to implement than ISDN, which requires the refitting of central office switches with new software, Pacific Bell is rolling out the switched 56K bit/sec service now in an effort to reach more customers sooner, according to Haggerty.

While all the major long-haul carriers offer switched digital services, the Bell operating companies' switched service support has been spotty, and many of the services that they have rolled out have been expensive, analysts said. The local carriers' rollouts have been marked by a mix of pure switched 56K bit/sec, ISDN and Centrex offerings as well as a range of deployment schedules.

Berge Ayvazian, a vice-president at The Yankee Group, a market research firm in Boston, said many of the current local carrier switched services have been priced at a premium and it is difficult to gauge the value of Pacific Bell's new service until a tariff is filed.

"What we're hoping for is that one of the local carriers will stick its neck out and get a tariff approved for a switched 56K [bit/sec] service that will be attractive to users," Ayvazian said. "That could become a model, and then the rest of the LECs will start falling into line. Maybe this will be it."

AT&T to upgrade PBX ISDN tool

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will be able to support six data devices on each D signaling channel. The data would be passed to a packet switch bus in the PBX, Sulkin said.

Analysts and users say the feature could spur ISDN use. It "could further ISDN by giving end users additional configuration options," said Chuck Kanupke, president of Kanupke Associates, Inc., a Haddonfield, N.J., consultancy. "More choices could mean more use."

Ed Hodgson, a network manager with Schindler Elevator Corp. in Morristown, N.J., said, "We've pushed AT&T to offer this feature for some time. We've even met with [AT&T Bell Laboratories] to discuss the problem."

Hodgson wants to combine the two 64K bit/sec B channels to form a 128K bit/sec link that would enable Schindler's Definity Generic 2 PBX in Morristown to support a low-speed videoconferencing application.

"If we can't use both B channels for data, we'll have to forget about [videoconferencing]," he said. "It's as simple as that."

Hodgson, a founder of the North America ISDN Users Forum and a member of AT&T's Definity user group said many other Definity customers would like to use both B channels to support data communications.

Carrier Watch

continued from page 13

MFS began providing alternative access services to Chicago firms in 1988. It also operates nets in Baltimore, Boston, Dallas, Houston, Los Angeles, Minneapolis, New York, Philadelphia, Pittsburgh, San Francisco and Washington, D.C.

Jones Lightwave, Inc. and Thurston Group, Inc. have formed a joint venture that will construct a 200-route mile, all-fiber bypass network serving users in Chicago and its suburbs. **Jones Chicago Lightwave, Inc.** will begin building the network next month and expects to have the project completed by midyear.

The Jones Chicago network has been designed to provide customers with total physical and electronic diversity and redundancy throughout the service area. Business arrangements for the certification, engineering, construction and financing of the Chicago network are being completed.

The Thurston Group is a merchant banking firm based in Chicago, while Jones Lightwave's corporate parent, Jones International, Ltd., owns a number of companies in the communications industry.

Washington Update

continued from page 13

Petroleum Institute all oppose AT&T's request. They say the opportunity to terminate Tariff 12 deals when 800 numbers become portable — often referred to as the "fresh look" provision — would protect users.

"Without 'fresh look,' all Tariff 12 customers will be stuck with increasingly ill-fitting options for the three- to five-year duration of their commitments," said the California and New York clearing house associations in a joint filing at the FCC earlier this month.

Alloting spectrum. The Federal Communications Commission last week set aside spectrum for a new interactive capability that broadcasters can add to commercial and educational broadcasts.

The new feature, dubbed Interactive Voice and Data Service (IVDS), can be used with broadcast television, cable television, wireless cable and direct broadcast satellites. Although the FCC did not specify the type of applications to be supported with IVDS, experts have suggested public polling, interactive games and shopping. The FCC set aside the 218- to 219-MHz band for the service.

V.3242i:

The ideal modem for good data over bad lines

With signal-to-noise performance of −43db, near- and far-end echo cancellation, adaptive line equalization and trellis coding, the UDS V.3242i becomes the modem of choice when datacomm capability outstrips line quality. It has already been selected for applications in China, in Egypt, and in other areas where the telephone infrastructure has not kept pace with datacomm developments.

The modem is fully compatible with CCITT V.32 for 9600 bps communication. MNP® level 5 data compression increases throughput to 19.2 kbps; V.42 *bis* compression pushes it all the way to 38.4 kbps. For error control, users may select MNP levels 2–4 or V.42 LAP-M.

The V.3242i automatically senses the speed of the remote modem it's connected to and adjusts to that speed. It has auto-dial and auto-answer capability for synchronous communication. When installed on private networks, it provides automatic dial back-up in the event of leased-line failure. It is available as a standalone unit or as a plug-in card.

Modem configuration and performance are user controlled from a front panel that includes a liquid crystal display and just three set-up buttons.

For detailed specifications and pricing on this remarkable new modem, contact IWP—Brussels, Belgium: 32-2-460-6838; Motorola Ltd.—Wallington, Surrey, UK: 44-81-669-9343; Motorola GmbH—Darmstadt, West Germany: 49-6151-88070-0; Smart Com—Ljubljana, Yugoslavia: 38-61-448-241.

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Worth Noting

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Roger Heinen Jr.
Vice-president and general manager
Apple Computer, Inc.
Cupertino, Calif.

Data Packets

Pittsburgh-based **Transarc Corp.** last week unveiled a tool kit for developing the Open Software Foundation, Inc.'s (OSF) Distributed Computing Environment (DCE)-based applications on Sun Microsystems, Inc. and IBM workstations.

The tool kit will allow application developers to write new applications or port existing ones incorporating OSF DCE technology on popular Reduced Instruction Set Computer-based platforms for client/server computing.

The kit, priced at $15,000, will be available in March for Sun SPARCstations and IBM RISC System/6000s.

McDATA Corp. of Broomfield, Colo., last week announced reseller agreements with **Walker, Richer & Quinn, Inc. (WRQ)** of Seattle and **Interlink Computer Sciences, Inc.** of Fremont, Calif., for multivendor networking software.

McDATA will resell WRQ's Reflection Network Series personal computer-based terminal-emulation software that supports links to IBM mainframes as well as Digital Equipment Corp. and Unix hosts. McDATA also expanded an existing reseller agreement with Interlink to include that company's DECnet software for IBM hosts, which enables DEC users to access data on IBM mainframes.

Andrew to focus on linking LANs to IBM AS/400 minis

New corporate thrust will meld two divisions.

By Joanne Cummings
Staff Writer

ANAHEIM, Calif. — Andrew Corp. last week at the Midrange Expo here detailed a new strategy intended to broaden its corporate focus by providing products to link LANs to IBM Application System/400 minicomputer environments.

The company already provides 5250 terminal-emulation boards and software for linking stand-alone Unix- and DOS-based microcomputers as well as Apple Computer, Inc. Macintoshes to AS/400s. The firm now intends to focus its efforts on linking token-ring local-area networks to AS/400s.

"A lot of customers started out with just a handful of PCs, so a 5250-emulation card and [twinaxial cable] connection was sufficient to communicate with the AS/400," said Tim Wright, director of LAN product planning at Andrew Corp. "But as the PC base grows at those AS/400 sites, [twinaxial cable] connections are not enough. [Customers are looking] for ways to enable work groups to share the same AS/400 server, and token ring is the answer."

Previously, the Andrew Corp. division responsible for LAN products worked independently of the division responsible for mid-range connectivity. Under the new strategy, the company plans to meld the resources of both divisions and offer AS/400 connectivity options to token-ring users.

Allen Brandt, director of mid-range marketing, offered several scenarios detailing how the company could use its strategy to help customers integrate AS/400s into LAN environments. Rather than putting a token-ring adapter in the AS/400 and installing

(continued on page 19)

AT&T Paradyne mux melds traffic onto single T-1 link

By Jim Duffy
Senior Editor

LARGO, Fla. — AT&T Paradyne recently unveiled a multiplexer that it said will reduce network costs for users by consolidating multiple circuits onto a single T-1 line.

The 32-port Acculink 742 T1/FT1 multiplexer merges traffic from analog and fractional T-1 lines, as well as from AT&T's Dataphone Digital Service, Software-Defined Network and Megacom circuits, onto a single physical T-1 facility.

AT&T Paradyne is reselling the device, which is manufactured by Tellabs, Inc., under an agreement stemming from a 1990 partnership between the companies.

The Acculink 742 comprises an eight-slot chassis that supports four-port add-on modules. The unit supports synchronous data rates from 1,200 bit/sec to 1.5M bit/sec and asynchronous data rates from 300 bit/sec to 19.2K bit/sec. Dataphone Digital Service lines run from 2,400 bit/sec to 56K/64K bit/sec.

Data interfaces include V.35, RS-422 and RS-232-C.

Voice rates are 64K bit/sec pulse code modulation or 24K and 32K bit/sec for adaptive differential pulse code modulation. Interfaces include two- and four-wire configurations.

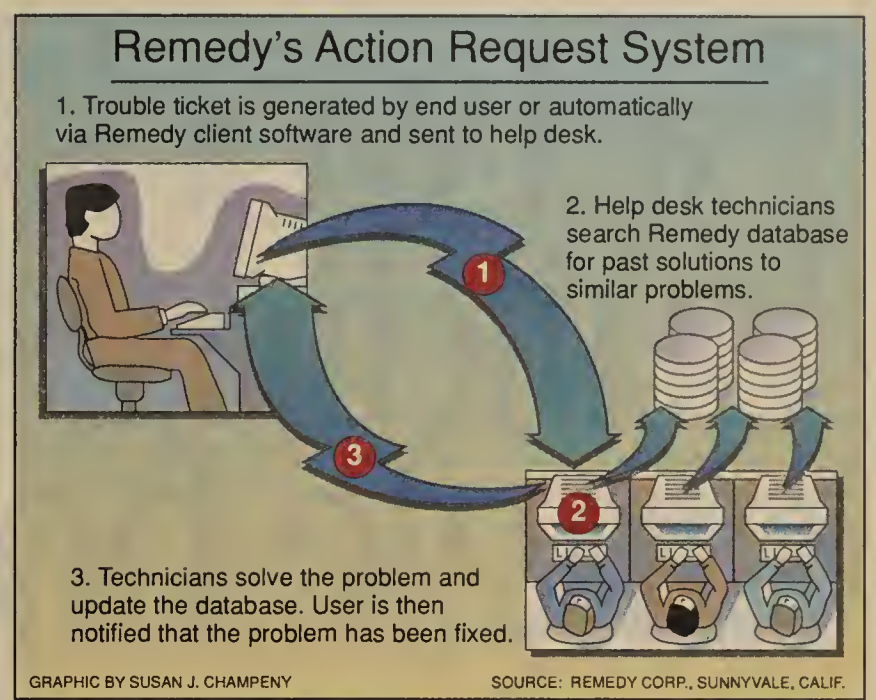
The new mux is compatible with AT&T Paradyne's other Acculink muxes, which are also made by Tellabs. The Acculink 742 can serve as a feeder mux into an Acculink backbone, the company said.

The Acculink 742 also comes with lower bandwidth requirements for Acculink supervisory data links. Supervisory data links carry event and alarm messages on Acculink nodes and enable users at a local node to assess the performance of remote nodes and reroute circuits around failed lines.

The bandwidth requirements for the supervisory data links are now in increments of 8K, 16K and 32K bit/sec instead of only 32K bit/sec, said Leigh Ionata, product marketing manager at AT&T Paradyne. This opens up more bandwidth for applications, she said.

The unit is also configurable from either an asynchronous terminal or AT&T Paradyne's Comsphere 6800 network management system.

Acculink 742 mux setups will be available Feb. 14, with pricing starting at $5,906.



Remedy application a winner with users

Early users report management tool streamlines process of logging, responding to net problems.

By Bob Brown
Senior Editor

SUNNYVALE, Calif. — Early users evaluating a new net management application from start-up Remedy Corp. last week said they expect that the program will let them better organize procedures for reporting and acting on network problems.

The users also said that if Remedy's trouble-ticket application has any faults, it would be that the software's configuration flexibility gives users a myriad of up-front options that complicates installation.

Remedy, which was formed in 1990 by network industry veterans Larry Garlick and David Mahler, unveiled its Action Request System in September at a press briefing during which a host of established network vendors that voiced their support for Remedy's strategy ("Software company offers net management remedy," *NW,* Sept. 9, 1991).

The Action Request System software, which is designed to operate in a client/server mode, is typically being used to enable users to log network problems by issuing trouble tickets via the telephone or electronic mail to technicians on a network help desk. The trouble ticket is then routed to the appropriate technician, who consults the application's database to find out whether similar problems have been encountered in the past and how they were addressed.

Once the problem is resolved, the database is updated and the user experiencing the problem is automatically alerted that the problem has been remedied.

The Xerox Corp. Palo Alto Research Center (PARC) in California is testing the software throughout this month and hopes to roll out the system to various work groups during the next few months, said Carol Lehner, Xerox PARC's supervisor of systems administration and user support.

Currently, Xerox PARC is testing the Action Request System on a handful of Sun Microsystems, Inc. workstations. So far, the software has performed well, she said.

Martin Yonke, manager of computational infrastructure at Xerox PARC, said the research center plans to use the Action Request System as "a central reporting mechanism for action requests." Xerox PARC houses about 1,000 Sun, Xerox and Apple Computer, Inc. personal computers and workstations, he said.

Xerox PARC was attracted to the Remedy software because it will enable the organization to better coordinate the reporting of trouble tickets, Yonke said.

"Until now, there has been no one place to find and sort all the action requests that we've had, no way to keep a history of what we were doing about them or a good way to track the various ways we were handling problems," Yonke said. "The Remedy product would not only help us keep track of problems, but also would give us some history about how fast we respond to them."

Xerox PARC also plans to take advantage of the software's ability to automatically send users acknowledgments that their trouble ticket has been received by a

(continued on page 19)

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Andrew to focus on linking LANs, AS/400

continued from page 17

IBM's PC Support software on each personal computer, he said many companies would do well to simply establish a LAN-based gateway to the AS/400 by outfitting a PC with a 5250-emulation board.

"IBM's PC Support is very memory-intensive, both on the PCs and the host," Brandt said. "Our gateway with 5250-emulation software requires almost nothing from the host and a lot less [from] the PC."

Brandt admitted that using 5250 emulation together with Andrew Corp.'s file-transfer software is slower than employing IBM's PC Support, but he claims it offers more features. Those include the ability to broadcast files or data from the AS/400 to as many as 10 PCs at once and enabling users to have their own customized menu for each application.

Ensuring data security

Wright said that bridging LANs to provide AS/400 access might also be a better option than adding direct LAN connections to an AS/400.

For example, if two corporate departments each had their own LAN and wanted to share the AS/400 being used as a server on one of them, a bridge could be used to link the LANs and filter traffic. This would ensure that data sensitive to one department could not be accessed by another, he explained.

"The AS/400 could exist as a mutual benefit to both rings," Wright said.

In addition to announcing the new strategy, the firm also unveiled enhancements to its remote LAN gateway and introduced plans to add source routing transparent (SRT) support to its local source routing bridge in time for NetWorld 92 Boston next month.

The company plans to offer a plug-in card for its existing Model 7606 local source routing bridge that will enable it to support SRT.

Together with new software, which will also be announced at NetWorld, the same 7606 will be able to support both source routing and SRT bridging protocols.

Wright said the firm does not currently support SRT on any of its products. He declined to offer pricing information for the upgrade option.

Andrew Corp. also announced enhancements to its NetLynx/5394 remote 5250 gateway for linking users on a token-ring network to an AS/400 minicomputer.

According to Brandt, the enhancements include support for 64K bit/sec Synchronous Data Link Control data transmission, up from the previous 9.6K bit/sec; unattended file transfer from DOS batch files using newly integrated software; increased diagnostics, including interpreted line trace; and additional users.

Remedy application a winner with users

continued from page 17

technician, Lehner said. The fact that Remedy software can run in conjunction with SunConnect's SunNet Manager network management system is also a plus, she said.

The only drawback to using the Remedy software that Xerox PARC has encountered so far, she said, is that setup is time-consuming.

"The most difficult thing about the software is that it is so flexible, you've got to really know what you want to do with it," Lehner said. "You've got to be real clear on what you need. That's where the initial setup takes some time."

The Action Request System is also being tested at an aerospace company, which was attracted to the software because of its database capabilities for trouble-ticket and software bug tracking, said a company source who requested anonymity.

The firm plans to use the Remedy software to establish a trouble-ticket tracking system that would replace the archaic and sloppy paper-based setup used by the firm today, he said.

"[Technicians] come in on different shifts, and people didn't let the other shifts know what they were doing. We had no record of why a printer was broken or why a computer crashed," he said. "The databases will serve as record keepers."

The aerospace firm was able to modify the databases embedded in the Remedy software in order to meet its needs within a matter of hours, according to the source.

"We estimated that if we built a similar system using internal development, it would have cost us about $90,000 just for software development, whereas the Remedy software costs just a fraction of that," he said.

The system could end up supporting about 200 client workstations, he added.

While the aerospace company is sold on the Remedy software, it would like to see some enhancements.

The Action Request System currently requires end users to go through too many menus, the source said. The system would probably be more attractive to end users if the menu could be shortened by basing it on conditional statements, he said. One example he offered would be if a user checked off a box on one menu that the problem occurred with an IBM product, the next screen would automatically ask if it was an IBM hardware or software problem and present phone numbers for IBM service personnel who can handle the situation.

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Worth Noting

"The distributed architecture market is driven by the business requirement to better utilize [current technology] investments. As companies connect PCs to enterprise networks, they are turning these personal productivity tools into group productivity tools, [and] distributed architectures are intended to facilitate this transition."

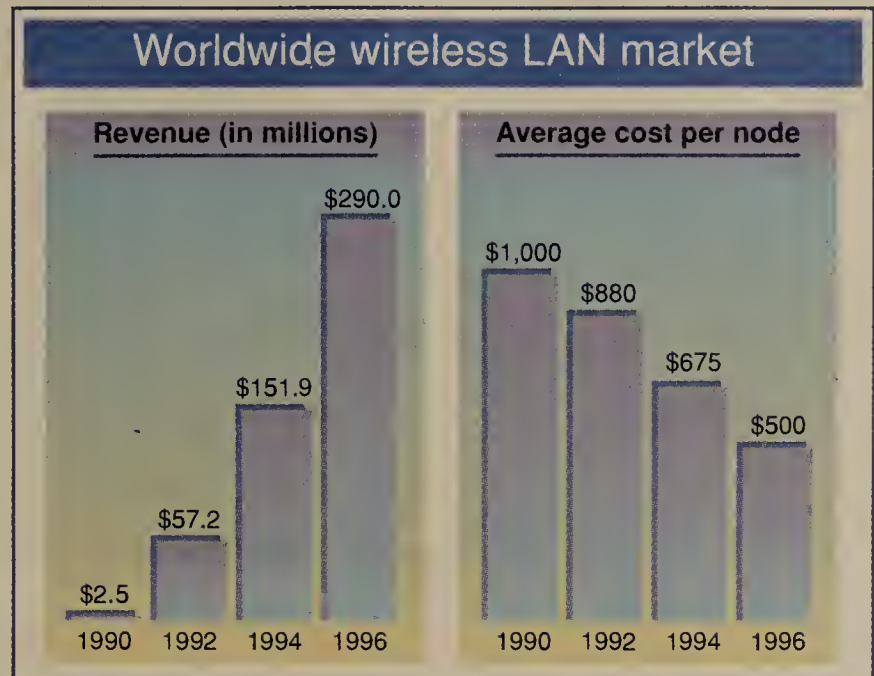
Kevin O'Neill
Vice-president of network computing strategies
Business Research Group
Newton, Mass.

Netnotes

NetWorth, Inc. last week introduced enhanced versions of its existing 8-bit, 16-bit and Micro Channel Architecture (MCA) EtherNext network interface cards and announced reduced prices on its EtherNext MicroHub.

According to NetWorth, based in Irving, Texas, the new interface cards include six diagnostic LEDs that show link status, packet receive, packet transmit, attachment unit interface select, collision and receive polarity reversed. In addition, each card has an automatic polarity adjustment feature that maintains the connection even when the unshielded twisted-pair wiring polarity is reversed.

At prices lower than those of previous versions, the adapters are available now in single units or five-unit packs. The 8-bit card costs $209, the 16-bit card costs $229, and the MCA card is priced at $259. Pricing on the MicroHub is now $645 for the nine RJ-45 port version and $675 for the version with eight RJ-45 ports and one BNC port. These new prices translate into less than $72 per port.



According to IDC, revenue in the wireless LAN market will increase dramatically between 1990 and 1996. The average cost per node, however, will steadily fall as pressures from declining cost of Ethernet and token-ring connections reduce the price of wireless connections.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Firm offers low-cost LAN hub with add-on net mgmt.

SNMP unit can support 14 12-port concentrators.

By Timothy O'Brien
West Coast Bureau Chief

FREMONT, Calif. — Accton Technology Corp. is scheduled to announce today a 10Base-T Ethernet hub line that will allow users to add network management as the system grows.

Accton's new EtherHub 1000 family consists of the EtherHub-12i, a low-end network concentrator, as well as the EtherHub-MGT console and AccView network management software, which adds Simple Network Management Protocol support as the network expands.

Pain-free upgrading

"We've made it painless for users to upgrade a network," said Marshall Behling, marketing director for Accton. "By being able to add components one piece at a time, it's about as plug-and-play as you can get."

The EtherHub-12i is a 10M bit/sec 12-port wiring concentrator that can be used as a standalone device linking 12 users, or the device can be used in conjunction with as many as 14 other EtherHub-12i units to support 168 users.

The EtherHub-12i conforms to the IEEE's 802.3 10Base-T standard, including the proposed standard for hub management, and supports workstations using unshielded twisted-pair cabling and RJ-45 connectors. Separate BNC and 15-pin D-type connectors are included on each EtherHub-12i, so workstation ports do not have to be sacrificed for backbone connections.

SNMP support can be added to the EtherHub-12i by plugging the hub into the EtherHub-MGT, an external SNMP management device.

The EtherHub-MGT unit includes a Management Information Base I- and II-compliant SNMP agent and comes bundled with the AccView software. The EtherHub-MGT can manage as many as 14 devices, such as hubs, bridges and multiport repeaters.

The EtherHub-MGT unit supports in-band SNMP management based on network connections, as well as out-of-band SNMP management via direct RS-232 links or terminal-emulation access.

Net management

AccView, when running on a personal computer, utilizes Microsoft Corp.'s Windows 3.0 graphical user interface to provide a configuration map of the network, using individual icons to represent different network elements.

AccView requires 1M or 2M bytes of random-access memory, depending on whether Windows' enhanced mode is used.

In addition to creating a network map, AccView monitors network performance, gathering statistics about network traffic and providing alarms when traffic exceeds a specified threshold or a failure occurs.

The EtherHub 1000 system is expected to ship next month. The EtherHub-12i costs $1,099, and the EtherHub-MGT costs $899, which includes the cost of the AccView 1.0 software.

Novell LANalyzer gets features boost

Firm adds enhanced expert system capabilities and new report generation element to product.

By Caryn Gillooly
Senior Editor

SAN JOSE, Calif. — As expected, Novell, Inc. last week brought out a new version of its LANalyzer network analyzer that expands on the product's expert system capabilities and includes new report generation and protocol decode features.

The new version, LANalyzer 3.11A, also comes with a new, smaller Ethernet card so the product can be installed in virtually any standard personal computer chassis, including most new notebook computers.

According to Duane Murray, vice-president and general manager of Novell's Network Management Products Division, based here, there are four primary LANalyzer upgrades.

The first enhancement is an increase in the number of predefined testing routines included in the LANalyzer's Automated Troubleshooting System (ATS) — from 146 to more than 175. ATS is the LANalyzer's expert system that detects network problems, helps an administrator identify the source of a problem and suggests possible solutions.

The new tests help to highlight duplicate Internet Protocol (IP) addresses, routing loop errors and beaconing token rings, among other things.

According to Novell, these tests can also provide information on token rotation time, Ethernet packet collisions and broadcast storms. As with the previous version, Version 3.11A lets experienced users create their own tests.

With the new testing capabilities come new reporting capabilities. These let the administrator generate network reports using Microsoft Corp.'s Excel and Lotus Development Corp.'s 1-2-3 spreadsheets.

LANalyzer 3.11A lets the administrator plot information gathered by the LANalyzer onto full-color graphs using graphing tools included with Excel and 1-2-3, according to the company.

A third enhancement is the addition of decode capabilities for five additional network proto-

(continued on page 22)

Firm to intro brouter for linking FDDI, E-net LANs

By Joanne Cummings
Staff Writer

WASHINGTON, D.C. — Fibronics International, Inc. this week is expected to unveil a new multiprotocol brouter for linking Fiber Distributed Data Interface and Ethernet LANs.

The company's FX8210-B brouter is one of the first products to fully support the IEEE 802.1D standard for FDDI translation bridging, enabling it to process all network protocols, said Bill Panepinto, director of marketing at the firm.

The brouter has one FDDI interface and two 802.3-standard interfaces for Ethernet local-area networks. It can route Internet Protocol and Digital Equipment Corp. DECnet data packets, as well as transparently bridge all other network protocols, including DEC's Local Area Transport, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Xerox Corp.'s Xerox Network Systems, Panepinto said.

This offers users the high speed and performance of an FDDI bridge, combined with the increased control of a network router, he explained.

The FX8210-B can bridge as many as 10K packet/sec and can route up to 7.5K packet/sec, according to Panepinto.

SNMP agent

The brouter also contains an industry-standard Simple Network Management Protocol agent that enables it to be managed by either Fibronics' Unix-based InterView Network Management System or by any other standard SNMP manager.

Available this week, the FX8201-B brouter is priced at $21,990 for a single Ethernet configuration and $26,999 for a device supporting two Ethernets.

For more information, contact Fibronics at 1 Lowell Research Center, 847 Rogers St., Lowell, Mass. 01852, or call (508) 937-1600.

LANalyzer gets features boost

continued from page 21

cols: Digital Equipment Corp.'s Local Area Transport terminal emulation protocol; the Simple Network Management Protocol over Novell's Internetwork Packet Exchange (IPX); the Open Shortest Path First IP routing protocol; the X Window protocol, which is used to transfer graphical user interface information over a network; and the company's own NetWare Lite protocols.

With these additions, administrators can now see detailed information about data packets structured according to as many as 18 different protocols.

New Ethernet card

Finally, LANalyzer 3.11A and future releases will come with a smaller Ethernet card that has been enhanced to run the products 20% faster than the previous version, according to Murray.

He added that the new Ethernet card provided with the LANalyzer is the first analysis controller with built-in support for 10Base-T. Additional products need a separate transceiver for 10Base-T connectivity.

In general, users seemed pleased with the new release, saying they have needed the added capabilities.

"This new version seems to work fine," said Bill Chipman, local-area network coordinator at Tandy Information Services, a division of Tandy Corp., based in Fort Worth, Texas. "[Novell added] some features that I had liked in Cabletron [Systems, Inc.'s] network analyzer."

Chipman said the most useful new features are the product's ability to categorize workstations by the amount of traffic they generate and its enhanced filtering capabilities, which let the administrator watch several traffic patterns at once rather than one at a time.

Currently available, LANalyzer 3.11A costs $12,500 for the Ethernet-only or token ring-only versions and $19,980 for the combination Ethernet/token-ring version.

The price includes the ATS, full decodes for 18 protocols, LANalyzer operational software, a specialized network analyzer interface card and documentation.

Current LANalyzer users covered under Novell's LANalyzer Update Program will receive the 3.11A software at no cost.

Carriers to connect services

continued from page 9

meaning they do not support the passing of data that will be critical in a production implementation. If Network A, for instance, cannot convey to Network B that it is congested, Network B may continually send data that Network A will not be able to deliver. Consequently, packets will be thrown away and the user forced to retransmit, Gourley said.

To address such issues, the Frame Relay Forum last October established an intercarrier committee.

According to Chris Winslow, manager of network product marketing at CompuServe, Inc. and a member of the forum's intercarrier committee, the group is addressing provisional and operational issues with respect to interconnecting frame relay networks.

It is leaving the work on the protocols for network-to-network interconnection to the Frame Relay Forum's technical committee, which, in turn, will make recommendations to ANSI and the Consultative Committee on International Telephony and Telegraphy, he said.

"Our biggest challenge is how to address the committed information rate," Winslow said. CIR is the minimum bandwidth to which a user is guaranteed access in a frame relay net. Many carriers allow users to send bursts of data at speeds greater than their prescribed CIR.

The problem arises, however, in negotiating CIR between vendors' networks. Ben Lisowski, director of data product planning at Sprint Data Group, noted that not all vendors define CIR the same and some have implemented it differently. For example, some carriers offer a wider array of CIRs than others.

"The problem is we're offering a service with guaranteed bandwidth capacity, and if we interconnect with a carrier that doesn't offer it, it's null and void," Lisowski said. "It's more or less the weakest link in the chain that's going to govern the entire connection."

Andrew May, director of marketing for network services at CompuServe, said another interconnection issue is the inability for carriers to pass Local Management Interface (LMI) data between nets.

LMI is used, for example, to check the status of a router connected to a frame relay net. If LMI data cannot be passed between networks, a user may not be able to check the status of all devices from a central point in the network, May said.

Another issue is billing. Most carriers price their frame relay service in a slightly, if not drastically, different fashion from their competitors. Such discrepancies would have to be worked out before an interconnection service can be offered to users.

Although the network-to-network standard being addressed by the Frame Relay Forum's technical committee will focus on many of these issues, it will likely be some time before its recommendations become ANSI or CCITT standards.

"We've really just begun to scratch the surface on this," said WilTel's Gourley.

Therefore, most carriers expect to intially implement proprietary links with other carriers on a case-by-case basis.

"In the absence of a specification that everyone agrees to, we're really experimenting to see how current implementations work," said Lisowski. "Whether or not we can provide full-featured, reliable robust service remains to be seen."

Dayna offers net mgmt., connectivity tools for Mac

By Caryn Gillooly
Senior Editor

SAN FRANCISCO — Dayna Communications, Inc. last week introduced new network management and connectivity tools for Apple Computer, Inc. Macintoshes and added a new 10Base-T Ethernet hub to its product line.

The highlight of the announcements, made at MacWorld Expo here, is the company's new Network Management System. The product, which includes three different tools, is one of the first designed to give administrators of Apple's AppleTalk internetworks a centralized view of network status and performance.

The tools include fault monitoring software, called Network Vital Signs, which runs in the background on any Macintosh and monitors the network for changes in the status of devices such as file servers, routers, printers and network modems.

The software allows an administrator to choose the devices to monitor and the conditions that will set off alarms. Once a preset threshold is reached, the program can send a visual or audio alarm to the administrator and launch any previously defined macro or application program.

The other tools are the NetScope Probe and the NetScope Console, a combination hardware/software traffic monitoring system. The NetScope Probe is a device connected to either an Apple LocalTalk or Ethernet segment of the network that gathers information about net traffic.

The NetScope Console software runs on any Macintosh on the net and polls the NetScope Probe periodically to gather network statistics and depict them graphically to the administrator.

The Network Vital Signs software can also collect information from NetScope Probe.

"Until now, AppleTalk network managers have had only packet analyzers, network inventory products and local traffic monitoring tools," said Boyd Jones, president and chief executive officer of Dayna, based in Salt Lake City. "While these are useful for tracking down certain problems, none gives an overall view of the network or the status and performance of key devices."

The other two products Dayna unveiled at the show were its NetMounter software and DaynaSTAR Hub-12.

NetMounter is a utility that lets individual Macintosh computers access Novell, Inc. NetWare file servers without using Novell's NetWare for Macintosh software.

The DaynaSTAR Hub-12 is a rack-mountable 12-port hub for 10Base-T Ethernet networks. Previously, the company offered the DaynaSTAR 8-port hub.

The Network Management System will be available in the second quarter. The three pieces bundled together will cost $1,199. Separately, the Network Vital Signs software will cost $449, the NetScope Console will be priced at $449 and the NetScope Probe will cost $499. A bundled package of the NetScope Console and NetScope Probe will cost $899.

The NetMounter software will be available in March. Pricing will be $99 for a single-user license, $395 for a five-user version and $595 for a 10-user license. The DaynaSTAR Hub-12 will be available next month for $995.

New NetWare NFS includes FTP gateway

By Timothy O'Brien
West Coast Bureau Chief

SAN JOSE, Calif. — Novell, Inc. last week announced a new version of NetWare NFS, add-on software for NetWare 3.11 that broadens support for Unix clients.

Enhancements in NetWare NFS Version 1.2 include a File Transfer Protocol (FTP) gateway, an X Window application called X Console and a bidirectional print gateway.

"Novell's improved Unix integration is a good first step forward because this added functionality has been needed," said Jamie Lewis, senior analyst with The Burton Group, a consulting firm in Salt Lake City.

NetWare NFS, introduced almost a year ago, is Novell's implementation of Sun Microsystems, Inc.'s Network File System and supports all major versions of Unix currently available. Consisting of a set of Network Loadable Modules, NetWare NFS enables NetWare 3.11 to provide native file and print services for Unix clients.

NetWare NFS runs as a service within the Transmission Control Protocol/Internet Protocol stack on the server and does not require client software.

One of the new features in Version 1.2 is an FTP gateway that allows any client running TCP/IP to transfer files to and from any NetWare server using FTP.

NetWare NFS's X Console application allows any X client to remotely administer a NetWare 3.11 server using the NetWare administration utilities such as MONITOR, TCPCON and NFS ADMIN. This would enable administrators to remotely configure and troubleshoot multiple NetWare servers from a Unix workstation running X Window.

Finally, Version 1.2's bidirectional print gateway will enable NetWare users to print to Unix printers and Unix users to print to NetWare printers.

NetWare NFS Version 1.2 is available now at $4,995 for a single copy and $14,995 for five copies.

Version 1.1 customers can purchase upgrades to Version 1.2 for $750 until July 31.

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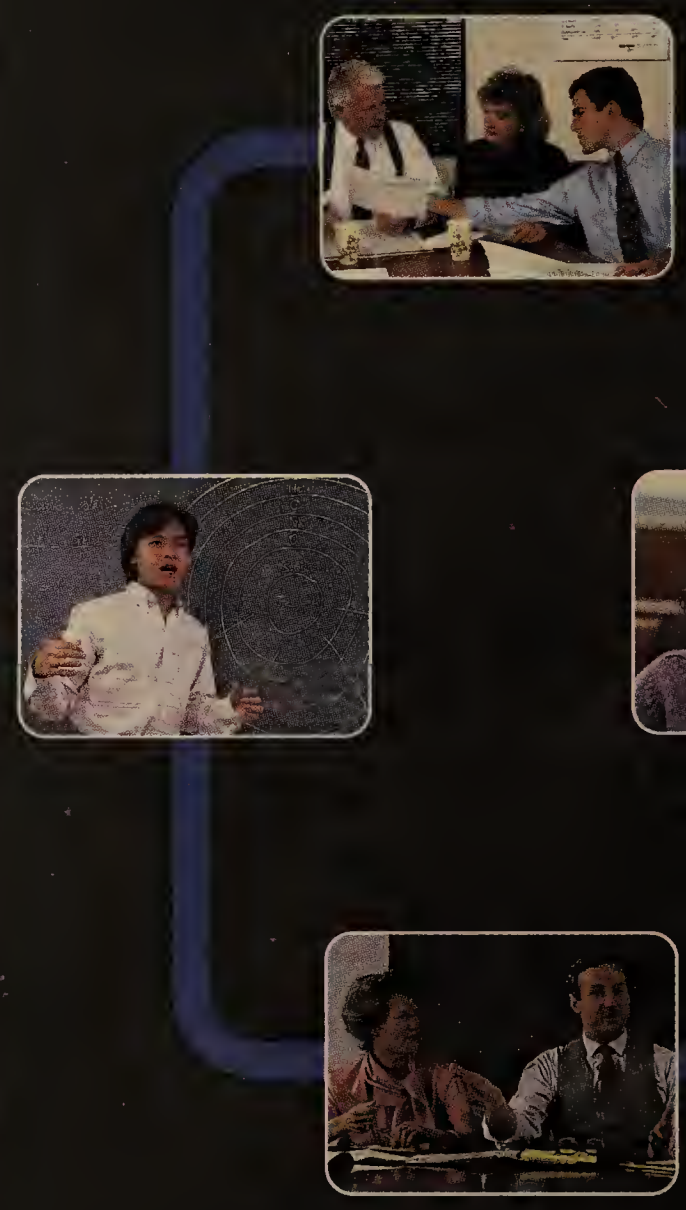

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Dialogue

Are you willing to trust your mission-critical applications to local-area networks rather than host systems?

"Definitely yes. The amount of downtime we currently experience with our LANs, in contrast to mainframes, is significantly less.

"In addition, the cost of fixing a problem on the LAN is minute compared to big mainframe systems.

"A mainframe is only necessary for users with extremely large data sets, such as those for aircraft or automotive design, since these require more computing horsepower. But for most business applications, LANs can do the job quite nicely."

Greg Scott
Computing services manager
College of Business
Oregon State University
Corvallis, Oregon

"Yes. I'm currently looking at a new call-processing system that will do department chargebacks, telephone service orders, and trouble reporting.

"The thing I'm wrestling with right now is buying a system for the long haul. All research and development in the industry is going into LAN-based systems. I'm afraid that if I get a mainframe system, they'll be no new R&D on it.

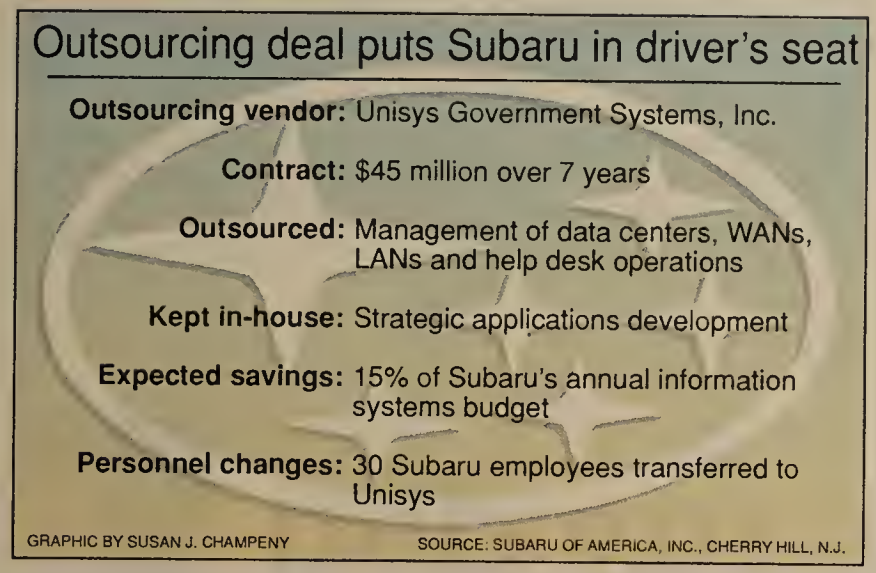
"I have real concerns about installing a mainframe system. They're good now, but where are they going to be five years from now? If I get into a LAN environment, my system will develop along with the industry. You have to go where the R&D is."

Robert Bursick
Director of telecommunications
Wayne State University
Detroit

"Yes. We're currently migrating off a network of minicomputers and will be moving our mission-critical applications onto a local-area network over the next several years.

"We don't feel we need the security blanket of a mainframe. The LAN platform is sufficiently reliable, and we intend to use it as an essential component of our mission-critical systems."

Bob Beckley
Director of technology planning
Brigham and Women's Hospital
Boston



Subaru to outsource daily net operations to Unisys

United Technologies also signs outsourcing deal.

By Joanne Cummings
Staff Writer

CHERRY HILL, N.J. — Subaru of America, Inc. recently announced it has signed a preliminary agreement to outsource the management of its day-to-day network operations to a Unisys Corp. subsidiary.

In a separate action, United Technologies Corp. of Hartford, Conn., revealed that it had signed a long-term agreement under which IBM subsidiary Integrated Systems Solutions Corp. (ISSC) will take over the operation of its Newington, Conn., data center.

Subaru said it sought the outsourcing arrangement so it could focus more attention and financial resources on strategic application development rather than on basic network operations. The carmaker plans to save 15% of its annual information services budget through the deal.

The agreement, worth $45 million over seven years, calls for Unisys Government Systems, Inc. to take over all of Subaru's network operations, including management of its Unisys mainframe, DCP-35 front-end processors and Novell, Inc. NetWare local-area networks, as well as its customer and network help desk. Subaru will retain control over its strategic application development.

Service and flexibility

"We feel that outsourcing will give us the service level and flexibility we need, save us money and enable us to better concentrate on the applications area," said Herman Berg, senior vice-president of information and administrative services at Subaru.

According to Berg, the outsourcing plan calls for Unisys to establish a regional processing center at Subaru's existing national data center in Pennsauken, N.J. That center currently supports five regional sales centers, six regional distribution centers and 650 dealerships across the country, all of which are linked to the data center through point-to-point and dial-up lines.

Thirty employees will be transferred from Subaru to Unisys as part of the project.

New applications

The outsourcing deal will free up Subaru resources for at least three strategic network applications currently under development, Berg said.

These include an Owner Service Center application that will handle all customer inquiries received via the company's 800 number. The application will consist of call management and call tracking systems and will provide customer service representatives with rapid access to mainframe-based customer files, said John Piccone, director of business information systems at Subaru.

Another application under development is Tech Link, a LAN-based problem tracking application that is designed to improve coordination and maintain a history of technical service calls handled by service technicians at dealerships nationwide.

The third application is a new vehicle distribution system that will use market forecasting data and dealership requests to ensure that the right automobile gets delivered to the right place at the right time, Piccone said.

The outsourcing deal is scheduled to go into effect March 1.

The United Technologies agreement calls for ISSC to take control of the company's Newington data center, which currently provides data processing support for the firm's Sikorsky Aircraft, Hamilton Standard Co. and Norden Systems, Inc. units.

According to John Rolls, executive vice-president and chief fi-

(continued on page 26)

Inventory tracking inspires innovation

As corporate LANs grow, users try new tools, methods for keeping tabs on hardware, software.

By Wayne Eckerson
Senior Editor

When asked about the number of workstations and local-area networks within their company, some network managers scratch their heads, pause a couple of seconds and say, "Well, to the best of my knowledge. . ."

Keeping track of net inventory has never been easy, but the proliferation of LANs has made it almost a herculean task. Many firms have some idea how much network and computing equipment they have and where it's located, but few know exactly.

That can lead to a number of problems. Companies need an accurate count of hardware and software to ensure that they are not paying maintenance fees on equipment they do not have and to comply with licenses governing the use of software.

Accurate inventories also enable net managers to negotiate better deals on volume purchases and assess accurate chargebacks to corporate departments for network usage and support services.

To get a better handle on net inventory, many firms are implementing new procedures and systems that automatically maintain an accurate count of network and computer components.

Some companies are centralizing the purchase and distribution of network and computer equipment to gain greater control. Others are establishing a centralized database containing inventory, problem management, configuration management and other data that can be accessed by its support groups.

The corporate information systems group at United Parcel Service, Inc. in Mahwah, N.J., purchases all workstations as well as LAN and wide-area network equipment used by the company. New equipment is then delivered to UPS' principal airline hub in Louisville, Ky. A computer support group there logs each piece of new equipment into a personal computer-based database before sending it out to UPS sites.

Centralizing the purchase and distribution of all hardware and software enables UPS to maintain

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EXECUTIVE BRIEFS

BY MAUREEN MOLLOY

Internetworking made easy. Bridge/router manufacturer Wellfleet Communications, Inc. recently authored an educational handbook on the key concepts of local-area network internetworking technology.

Simplifying LAN-WAN Integration serves as a primer for network managers who design and implement corporate networks but have no firsthand experience with LAN internetworking. Written in layman's terms, it explains repeaters, bridges, routers and gateways and provides insight into internetworking equipment and design considerations.

The handbook also presents user case studies and a sample return-on-investment model, which will be of interest to users responsible for cost-justifying network equipment purchases.

Available now, the handbook can be obtained by calling Wellfleet at (617) 275-2400, Ext. 8.

The basics of intelligent hubs. Fibermux Corp. recently published the *LAN Hub Applications Guide* to help users build a structured enterprise local-area network using intelligent wiring hubs.

The guide is a combination tutorial/reference book that features an extensive case study, illustrations and charts. It also offers tips on building a structured LAN, selecting a LAN topology, simplifying network moves, adds and changes, and using network management technologies.

The guide is available directly by calling the Fibermux product support group at (818) 709-6000.

Subaru to outsource net

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nancial officer at United Technologies, the deal will enable the company to save money while leveraging ISSC's data processing expertise. "It will enable [United Technologies] to take advantage of the latest advances in large systems computing while significantly lowering our information processing costs," he said.

In addition to assuming the management and operation of the data center, ISSC will take responsibility for all of United Technologies' existing hardware leases and systems software.

The agreement took effect Jan. 1.

Tracking spurs innovation

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accurate information about inventory, said Marc Dodge, manager of network management systems at UPS. This helps net managers keep track of UPS network and computer inventory and makes it easier to troubleshoot errors in remote systems.

Jonathan Gillies, network manager for Motorola, Inc.'s marketing information systems in Phoenix, is hoping to persuade the company to implement a LAN-based tool that automates collection of net inventory.

Currently, LAN administrators count equipment and pass the data in the form of an ASCII file to a network site administrator who compiles the data and sends it to a regional manager. The regional manager sends the data to a corporate group that inputs it into a central database, Gillies said.

But he wants each LAN administrator to use Brightwork Development, Inc.'s LAN Automatic Inventory software, which scans Novell, Inc. LANs and creates a file listing all hardware and software components on the LAN.

Gillies said the software, which he currently uses to manage his nets, speeds the process of collecting and disseminating inventory data, making inventory management less burdensome for net managers.

Other companies are beginning to consolidate various local or regional inventory and configuration databases into a single centralized database that all information support groups can access.

Northern Telecom, Inc., for example, is developing a centralized database of inventory, billing, problem management, change management and configuration management data using Computer Associates, Inc.'s NetMan network management software. All computer and network support groups will access the IBM host-based system using IBM terminals.

"The [centralized database] eliminates redundant and overlapping network management systems and puts all support organizations on the same platform, which adds consistency and uniformity to our reporting," said Bob Johnson, manager of information networks and problem management at Northern Telecom in Ann Arbor, Mich.

Shearson Lehman Brothers, Inc. has modified a commercial network management package to keep track of the 10,000 net devices, such as terminals, phones and market data feeds, at the company's corporate offices in New York.

The firm is in the process of updating the package with network inventory from each of the company's 300 branch offices. It is also implementing IBM's Station Manager, which runs with IBM's LAN Manager, to track hardware and software running on Shearson Lehman's distributed LANs. The IBM software automatically identifies PC addresses, as well as server and workstation configurations.

In the future, Shearson Lehman would like to replace the network database with a groupware database that would provide a configuration diagram of each user's network and computing environment.

"A groupware product would ensure that everyone is working off the same data and facilitate communication to coordinate work," said Ira Morrow, vice-president of advanced technologies at Shearson Lehman.

Worth Noting

Lynx Technologies, Inc. of Little Falls, N.J., today plans to introduce a service that will enable users to dial in with personal computers to obtain on-line information about private-line, public switched telephone and public data network tariffs in nearly 200 countries.

World News

AT&T last week said it will be a major partner in a joint venture to build and operate a new long-distance telephone network in Ukraine.

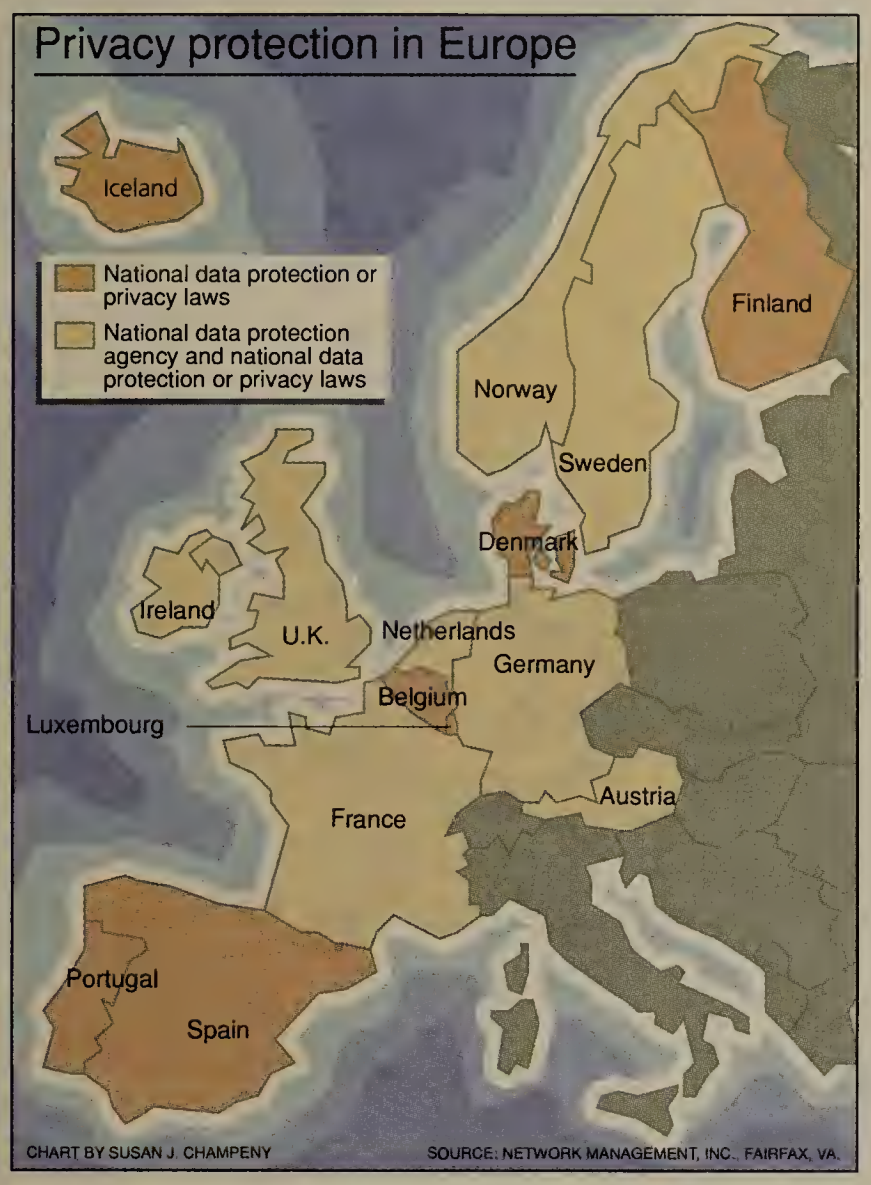
AT&T will own 39% of the joint venture, which has not been named yet. Ukraine's State Committee of Communications will own 51% of the venture and the Netherlands' national carrier, PTT Telecom, will own the remaining 10%.

AT&T said it will begin supplying 13 5ESS central office switches to the project in May. The venture team plans to manufacture another 12 central office switches inside Ukraine in the next two years.

The switches will be used to build a new public network in the state. This net will enable AT&T to provide direct-dial phone service to the state for the first time. Currently, all calls carried by AT&T to Ukraine require operator assistance and must be routed through Moscow.

AT&T said it has never played such a major role in designing and operating a foreign long-distance network.

In a separate action, AT&T last week changed the way it calculates charges for its Switched Digital International service. Instead of charging users for each minute of usage, AT&T said it will charge for the initial 30 seconds of a transmission and for each subsequent six seconds.



European carriers move fast to offer IVPN services

Service options lag behind U.S. carriers' offerings.

By Daniel Briere
Contributing Editor

European carriers are moving at a brisk pace to implement advanced virtual network service offerings, a promising sign for U.S. network managers maintaining links to foreign countries.

Many carriers overseas are also taking steps to expand the access options for their international virtual private network (IVPN) services, and several are beginning to address the need for network interconnection and advanced services such as those already offered by domestic carriers in the U.S.

Virtual private network deployment in Europe is progressing somewhat faster than in other parts of the world. By the end of the year, most European nations will have VPNs up and running. Most of these virtual network services are international in scope.

The first IVPN services appeared in June 1989 with the debut of on-net calling to the U.K. by TRT/FTC Communications. By the end of 1991, 21 IVPNs were in place in 13 countries. By the end of 1994, more than 40 IVPNs are expected to be in place in more than 24 countries.

Domestic virtual network services are due to follow with a lag of 12 to 18 months.

British Telecommunications PLC, which launched FeatureNet two years ago, expects to launch its domestic product this year. France Telecom has had its domestic Colisee service in operation since 1975. Other carriers, such as Telecom Ireland, will use combined Centrex/virtual nets for their domestic services.

Overall, the cost savings for IVPNs will be significant enough to make the decision to use virtual networks almost automatic for most users. The usual discounts average 10% to 30% under international direct dial (IDD) rates. Weighing the benefits of cost savings against those of private lines is more user-specific and is basically a question of how much voice traffic the user generates.

The big problem users will run into is how different the services are relative to U.S. offerings.

Most European virtual private network services run through a single switch. Private number plans and discounted IDD rates

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Briere is president of TeleChoice, Inc., a Montclair, N.J., consulting firm.

Privacy issues loom as global net hurdle

Net managers must balance data needs against privacy rules outlined in country-by-country laws.

First of a two-part story examining the privacy issues related to the operation of global networks.

By James Kobielus
Contributing Editor

Managers of global networks must abide by the privacy laws of all countries in which they operate network nodes.

Not only must net managers comply with well-known laws such as those governing network equipment approval, but they must also comply with equally important but lesser known laws that protect the privacy of individuals.

But all too often, international net managers can be caught between divergent national privacy policies, never quite sure when they might violate a country's regulations and, subsequently, be prevented from engaging in transborder communications.

Transborder networks make privacy guardians nervous because nets provide a means to export personal data and, thereby, subvert domestic privacy laws.

For instance, a country that has stringent controls on domestic resale and reuse of mailing list data may be shocked to learn that this information is being transmitted to direct-marketing companies in a neighboring country and that marketers in the neighboring country are flooding the originating nation's consumers with unsolicited advertising and promotional material.

Some countries have prohibited or placed tight restrictions on transmission of personal data to countries whose privacy laws they deem inadequate.

In 1989, for instance, the French government's data protection board temporarily enjoined the automaker Fiat S.P.A. from transmitting French personnel records to Italy, whose privacy protection laws did not meet French standards. The French government only lifted the restriction when Fiat signed a formal agreement promising to protect the personnel information.

Countries such as France and Germany have omnibus national privacy laws applicable to all sectors of their economies, while others — most notably, the U.S. — have a hodgepodge of national and regional laws applicable to specific industry sectors and data categories (see graphic, this page). Privacy laws are rare in the Asia-Pacific region — excluding Australia, Japan and New Zealand — and almost nonexistent in Africa and Latin America.

Given the inconsistent nature of privacy regulations worldwide, network managers should heed several general guidelines.

First, global network managers should encourage their companies to establish internal privacy protection codes that conform to widely accepted principles and comply with the domestic privacy laws of all countries in which they do business. Many multinational companies already have corporate privacy codes that are based on international standards, such as the 1980 Council of Europe Convention for the Protection of Individuals with Regard to Automatic Processing of Personal Data and the 1985 Organization of Economic Cooperation and Development (OECD) guidelines.

Acquire only as much data as is "necessary and relevant" to corporate business.

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American Express Co. established its 10-point Privacy Code of Conduct in 1978, prior to the issuance of the OECD document.

The code covers the following points:

- Acquire only as much personal data as is "necessary and relevant" to corporate business.
- Obtain such information directly from the individual whenever possible.
- Explain intended uses of personal data to the individual.
- Inform the individual when the data shall be used for other purposes.
- Establish "appropriate admin-

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Kobielus is a telecommunications analyst with Network Management, Inc., a local- and wide-area network systems integrator in Fairfax, Va.

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Int'l carriers move fast

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are the main features available, in contrast to the advanced features usually found in the U.S., such as call routing by time of day or call screening.

Another factor that differentiates virtual private network offerings abroad is how they require a user to connect to the net. BT's FeatureNet supports only dedicated access to the network. In the U.S., carriers offer a range of options including dedicated, Integrated Services Digital Network and switched access.

Dedicated access is not always needed, though. PTT Telecom Netherlands and Belgium's Regie des Telegraphes et Telephones (RTT) both have switched access to their virtual private networks.

"We can have our service up in a couple of weeks since it's all switched access," said Bruce Berenson, vice-president of RTT-Belgian Telecom USA.

Most services in Europe do not even have a network remote access feature, which would allow users to dial a toll-free number to make on-net calls.

Most of the advanced routing and screening features in the U.S. today are not going to be available in Europe for some time.

ISDN also plays an integral role in several of the advanced virtual private network features offered by carriers overseas. These features make use of the advanced signaling capabilities inherent in ISDN. However, while there are movements to interconnect domestic ISDN services, such interconnections generally occur only between national carriers with similar implementations of the underlying ISDN technologies.

The European Commission, which regulates the Common Market, is working to resolve differences in ISDN implementations by its member nations. Under the European Commission's guidance, the post, telegraph and telephone administrations in Europe have adopted a memorandum of understanding concerning basic ISDN service, which is supposed to be in place by the end of this year.

Waiting is the hardest part

But some carriers are not willing to wait that long and have formed alternative groups to address the interconnection problem. One group of carriers, led by US Sprint Communications Co. and Cable & Wireless PLC, formed the Global FON alliance to standardize features and capabilities across a uniform switching platform. The effort is an attempt by carriers that use Northern Telecom, Inc. DMS-250 switches to offer advanced virtual network features ahead of ISDN and other standards bodies.

In November, the CCITT Study Group I met in Japan to consider a U.S. proposal for global virtual network service standards that would define the services at a basic level. A similar meeting was held by AT&T in December in Coral Gables, Fla., involving 32 PTTs from around the world, including 15 European carriers.

The goal in both cases was to agree upon common components of international virtual network services that would ensure that multinational users could buy a basic set of virtual private network services in any country.

The AT&T group is expected to announce a plan within a month.

The best advice for users today is that they should deal directly with each carrier involved and treat IVPN service from each as an individual service with separate functionality. Global one-stop shopping for multinational virtual networks does not exist yet.

Carriers may have bilateral agreements with specific carriers in other countries, but this is not one-stop shopping. The Global FON alliance offers perhaps the closest thing to global one-stop shopping, as members have arrangements for starting service with other member carriers. However, even this requires involvement with each carrier by the end user.

The most integrated service available to users in the near future will be centralized ordering and fault reporting, but this will depend on multilateral agreements in development.

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Hilgraeve improves HyperAccess/5 protection

Hilgraeve, Inc. recently announced it has updated the virus protection features of its **HyperAccess/5** modem software to automatically detect 315 computer viruses.

According to Hilgraeve, HyperAccess/5 is the first and only modem communications software to incorporate virus protection. When users are receiving files via modem, it searches the files for virus infection. If a virus is detected, the software warns the users and allows them to abort the file transfer.

Registered users of HyperAccess/5 can download the new virus protection module from Hilgraeve's Customer Service Bulletin Board System free of charge. It is also available for $199 with new copies of HyperAccess/5.

Hilgraeve, Inc., Genesis Centre, 111 Conant Ave., Suite A, Monroe, Mich. 48161; (313) 243-0576.

NEC printer supports PostScript fax capability

NEC Technologies, Inc. last week unveiled at MacWorld Expo/San Francisco a laser printer that, with an optional board, can send and receive facsimiles in Adobe Systems, Inc. PostScript language. According to the firm, the **Silentwriter Model 95** is the first printer to offer the PostScript fax option.

The printer, which is designed for two to six users, supports the PostScript and Hewlett-Packard Co. HP Laserjet PCL 5 page description languages. It comes with one Apple Computer, Inc. AppleTalk, one parallel and one serial interface for linking to DOS or Macintosh computers.

With the optional fax board, the printer can exchange Group III or PostScript faxes with a fax-equipped Macintosh or personal computer, as well as with any stand-alone fax machine.

Scheduled for February availability, the printer costs $1,749. The fax option, available this summer, costs $599.

NEC Technologies, Inc., 1414 Massachusetts Ave., Boxborough, Mass. 01719; (508) 264-8000.

Firm preps bridges with SRT support

By Maureen Molloy
Staff Writer

PETALUMA, Calif. — Netronix, Inc. is planning to announce two high-end token-ring bridges that support source routing as well as the emerging IEEE source routing transparent protocol (SRT) standard, *Network World* has learned.

By supporting SRT protocols, Netronix's TML-2500 bridges will enable users to handle both source-routed and transparent data streams over the same bridge instead of deploying separate bridges to handle each data type, according to William Rosenberger, president of Netronix.

Combined support for the two data types also allows users to employ a single data line instead of maintaining separate lines for the different traffic.

Rosenberger said the products could be announced as early as next week's ComNet show.

The TML-2500 is a two-port local SRT bridge that supports both 4M and 16M bit/sec Token-Ring Networks.

Unlike most local bridges, the TML-2500 uses IBM's own Mini-Module Token Ring Chipset, making it a completely IBM-compatible device. This enables the bridge to achieve a packet forwarding rate of approximately 4K packet/sec, almost twice that of competing bridges that use a Texas Instruments, Inc. chipset.

Additionally, the bridge comes with Netronix's IBM LAN Network Manager-compliant software that enables users to manage the units from IBM's LAN Network Manager.

The TML-2500 costs $6,190 and will be available next month.

The TMR-4500, a remote version of the bridge for wide-area networks, supports a 4-to-1 data compression ratio at speeds up to T-1 rates.

The TMR-4500 will be available next month at a price of $6,640.

"Netronix is the company to watch for token-ring bridges," said Jerry McDowell, staff analyst at Dataquest, Inc., a San Jose, Calif.-based consultancy. The new bridges "are the hands-down winners in terms of IBM compatibility, performance and price."

Netronix said it will also announce plans to begin adding Simple Network Management Protocol support to its entire line of bridges beginning next month.

Support for both SNMP and LAN Network Manager is important for users with networks comprising Ethernet and token-ring local-area networks.

These users can employ an SNMP management station to control the Netronix bridges along with other Ethernet-attached devices while simultaneously monitoring Netronix and other token-ring nodes using LAN Network Manager.

Fotec to unveil portable analyzer for FDDI LANs

By Joanne Cummings
Staff Writer

WASHINGTON, D.C. — Fotec, Inc. is expected to introduce at the Communication Networks East show here next week a low-cost portable FDDI tester that can attach to an FDDI net and analyze LAN traffic.

The Link Confidence Tester (LCT) 100 can test both Fiber Distributed Data Interface links and nodes attached to an FDDI net. The company said it is especially useful for verifying that existing fiber-optic or shielded twisted-pair wiring is adequate to support FDDI transmission rates.

The LCT 100 is a portable, battery-powered, hand-held device with an LCD display and a standard FDDI connector. It also has an RS-232 port for linking with an external computer. According to the company, the LCT 100 can ascertain whether an FDDI connection or cable link is sound, as well as perform link error rate and control signal tests.

To test existing cabling, users can attach the LCT 100 to either end of a cable segment. The device will transmit FDDI data, and if the transmission is acknowledged at the other end, users can be assured that the bit error rate is acceptable and the wire can be used for FDDI.

To test FDDI stations, users can link the device to a station and the LCT 100 identifies the station type, performs link confidence tests and monitors station error rates.

Available by the end of the month, the LCT 100 is priced at $5,900, including a carrying case and AC recharger/adapter.

For more information, contact Fotec at 529 Main St., Box 246, Boston, Mass. 02129, or call (800) 537-8254.

Dolphin offers pack to manage NetWare

New software diagnoses faults on the fly; expert system offers manager steps to remedy condition.

By Joanne Cummings
Staff Writer

NORCROSS, Ga. — Dolphin Networks recently unveiled a PC-based network management system that can monitor the status of devices on Novell, Inc. NetWare LANs, diagnose faults and offer suggestions for resolving problems.

LAN Command Advanced, which will be demonstrated at NetWorld 92 Boston in February, is designed to provide users with more advanced features than those currently offered by network monitors and protocol analyzers for NetWare local-area networks, according to the company.

> "LAN Command Advanced can automatically inform the administrator before problems overwhelm the network."
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"The typical protocol analyzer won't signal the administrator if a server is running out of logon slots or if a remote node goes offline," said Phil Kim, marketing manager at Dolphin. "We designed LAN Command Advanced to be more proactive so it can automatically inform the administrator before problems overwhelm the network."

LAN Command Advanced is software that resides in an IBM Personal Computer XT, AT or compatible and is designed to manage any NetWare Version 2.1 or later LAN. It can be used with token-ring, Ethernet or Arcnet networks.

The software consists of several components. The first is a relational database containing information on each network node. This information includes traffic statistics, bandwidth utilization and user-defined thresholds. The software polls each node, collects statistical data and automatically enters the information in the database, enabling the user to keep a statistical history for each node on the LAN.

LAN Command Advanced also contains an expert system that processes statistical information as nodes are polled and can diagnose more than 1,000 NetWare-related problems. The software will display varying levels of alarms on-screen in real time along with a detailed text diagnosis and suggestions on how to solve the problems.

The product can be set to monitor every node, individual stations or selected groups of stations for LAN activity.

In addition, it can monitor remote network nodes linked to the LAN via bridges or routers, and it can detect unauthorized users on the internetwork and trigger an alarm.

The system contains a suite of benchmarking tools that can be used to test, analyze and tune a client, server or the entire network. The tools enable system managers to improve network performance by isolating faulty components.

In conjunction with LAN Command Advanced, Dolphin is offering LC Contact, a small terminate-and-stay resident (TSR) program. When installed on remote PCs, LC Contact enables LAN administrators using LAN Command Advanced to view and control a remote PC as if they were sitting at its keyboard.

> The software will display alarms on-screen in real time along with a detailed text diagnosis and suggestions on how to solve the problems.
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LAN Command Advanced is currently available. Its price ranges from $895 for a 50-node version to $7,995 for a 1,000-node version.

LC Contact pricing ranges from $249 to $169, depending on the quantity purchased.

For additional information, contact Dolphin at 4405 International Blvd., Suite B-108, Norcross, Ga. 30093, or call (404) 279-7050.

OPINIONS

SECURITY

BY EDWARD HORRELL

Vendors must warn users of toll fraud dangers

The problem of toll fraud is a big one. It's a safe bet that virtually any large user of long-distance service is going to be the victim of an attempted hack.

With toll fraud, unauthorized callers break into private systems and obtain access to long-distance facilities. They may sell the access codes over bulletin boards, use them to conduct private business (such as drug peddling) or sell them to private parties. The number of companies being hit by toll fraud is increasing, and the amount of damage in terms of dollars is skyrocketing.

In many cases, the amount owed the carrier is no small pill to swallow; in fact, it can amount to more than $100,000. Settlements with carriers typically average less than half that amount, but that's still a lot of money, especially in these recessionary times.

> Don't expect hardware vendors to take action without pressure from users.
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Yet in all that has been written lately about the problem, too much blame is being put on the carriers. No one seems to realize that the equipment manufacturers share in this blame.

Because the Federal Communications Commission has proclaimed that the user is responsible for payments to carriers even in the event of unauthorized usage, the ultimate victim of toll fraud is, of course, the user. And while the carriers have in some cases negotiated reduced settlements for fraudulent calls, they have pretty much refused to bear the brunt of these losses.

But what responsibility does the hardware supplier have here? In my opinion, it's time for the manufacturers of private branch exchanges and voice mail systems to get with the program and begin educating their customers as well as upgrading their systems with additional security protection.

Many of my clients have been victims of fraud. In one case, the distributor of an abused voice mail system said it didn't bother educating users of the possibility of fraud and reprogramming installed systems to protect against this problem because it didn't want to open the door to any liability if a problem did occur. Unfortunately, most of the interconnect companies and telephone hardware manufacturers keep saying, "It's not my problem."

To try to remedy this situation, users must insist that the manufacturers and maintainers of PBXs and voice mail systems provide details of any and all ways that access to the interexchange network can be attained through the system. Also, for protection, users should request all levels of security that are available as options.

The best forums for this dialogue are user groups and organizations. Don't expect hardware vendors to take action on this issue without a good deal of pressure from users.

I'm not suggesting that fraud problems are the fault of the hardware vendors; I am, however, suggesting that they have a responsibility to the user community to completely and accurately explain how their systems can potentially give hackers access to network calling.

This problem will be with us for a long time. Only through the combined efforts of users, carriers and hardware vendors can we shut the doors on the crooks who are stealing our network time. It's time to get the vendors in the loop.

Horrell is president of The Horrell Consulting Firm, Inc. in Memphis, Tenn., and a member of the Society of Telecommunications Consultants.

EDITORIAL

FCC's mishandling of Tariff 12 leaves users in a bind

The Federal Communications Commission has made a mess of AT&T's Tariff 12 deals, and it's leaving users to clean things up.

Last August, the agency ruled that because of AT&T's dominance in the 800 market, the carrier couldn't offer any new Tariff 12 custom network arrangements that include 800 services. That was clear enough.

But the FCC has also decided not to allow any modifications to existing Tariff 12 deals that include 800 services. Since August, the agency has rejected revisions proposed by AT&T for 10 or so of its big Tariff 12 customers, and other major revisions also appear to be on the chopping block.

That's not fair.

Users entered into these arrangements believing they were legal and then literally waited years for the FCC to set a clear policy regarding Tariff 12. Had they known early on that their deals would be subject to such shackling, many undoubtedly would have avoided them. Now they have to go to the trouble and expense of finding some way out of this quandary.

Users signed up for Tariff 12 because they believed it would benefit their companies. Now the regulatory process, designed to ensure that the industry serves the needs of users, has put them in a straitjacket. These users won't be able to adjust their nets as their needs change or competitive conditions warrant.

Worse, some Tariff 12 users have found themselves in the middle of a regulatory pinball game.

Two weeks ago, *Network World* learned that the FCC inadvertently permitted major revisions to three Tariff 12 deals — revisions that it intended to reject. The users who signed up for these deals are currently operating under the revised tariffs, but they will apparently have to revert to their original arrangements if the FCC gets its way.

That puts those users in a real bind.

A better approach would have been for the FCC to exempt the Tariff 12 deals in effect at the time of its August ruling and impose its restrictions only on new customers who would know exactly what they were getting into. This would have spared earlier Tariff 12 users from future legal or regulatory wrangling and concern about what the future holds.

The FCC's topsy-turvy handling of Tariff 12 will have a chilling effect on the market. Users will be increasingly leery of innovative service arrangements if they fear their networks will be in constant jeopardy from the apparently never-ending regulatory process.

OPINIONS

FRAME RELAY CONGESTION

BY BILL FLANAGAN

Problems with frame relay can be dealt with today

There is now a solution to the problem of congestion management in frame relay networks. Users can purchase customer premises equipment that responds to Forward and Backward Explicit Congestion Notification (FECN/BECN) bits received from the network.

Unfortunately, however, customer premises equipment can respond to FECN/BECN bits in several ways. Take, for example, local-area network routers. At present, routers do not generally respond to FECN/BECN signals. There are few ways other than the higher level control in Transmission Control Protocol/Internet Protocol and Open Systems Interconnection protocol stacks to pass flow control messages.

And what if a router could interpret a BECN bit and convert it to a TCP control signal, thus slowing the data rate? Is it likely that any vendor would be the first to implement such a technique and risk having its product branded a low-throughput router?

Traffic could be reduced by buffering the LAN frame in the router, rather than sending it immediately. However, one problem with this technique is that a personal computer waiting for a response or acknowledgment can quickly time out and send the frame again. If that retransmission occupies only the local cable, perhaps there would be no great harm to network throughput.

With wide-area networking protocols such as Synchronous Data Link Control or Binary Synchronous Control, dealing with congestion problems is simpler.

Vendors designed those protocols to include flow control. A smart frame relay installation takes advantage of the flow control features inherent in SDLC and BSC to control congestion.

Rather than simply encapsulating every SDLC frame, the frame relay terminal equipment must examine the SDLC frame and decide how to treat it.

In some WAN installations, polling can provide more than half the throughput. To reduce the potential for congestion, it makes sense to keep these polling frames off the WAN.

If it understands the protocol, the frame relay device — a frame relay assembler/disassembler (FRAD), for example — can tell that a frame is a poll. However, the FRAD can't simply discard a poll frame from a host because the host might decide the terminal has disappeared and thus kill the session. The FRAD must acknowledge the poll.

> Competition will eventually push up the utilization of the frame relay nodes and trunks.
>
> ▲▲▲

Likewise, at the terminal end, the corresponding FRAD must generate polls to replace those absorbed by the FRAD at the host. If not, the cluster controller will have no outlet for its terminal data.

At first glance, reducing the flow of data from a host or terminal into a frame relay backbone looks easy; simply slow the polling. That is, when the network is congested, the FRAD must insert a delay before each response it makes to either the host or cluster controller.

In effect, the FRAD imposes a time-division channel devoted to waiting. Doing this reduces the capacity of the access link and cuts the average data rate.

One drawback to this relatively straightforward approach is that all the terminals and sessions on a cluster controller would be flow-controlled at the same time, even if only one is involved in a congested connection.

Using the FRAD's understanding of the protocol to distinguish between logical connections, network managers can reduce the effective poll rate on only those sessions whose logical connections are congested.

Rather than adding waiting time to all responses, this type of FRAD uses the protocol features to reduce data flow. In BSC, for example, a wait acknowledgment response tells the terminal or host, "The circuit is OK, but the answering device is temporarily unable to deal with more data." By no small coincidence, that wording could also apply to the congested frame relay backbone.

Another customer premises equipment response that would help the network is lowering the threshold where the discard eligibility (DE) bit is set in transmitted frames.

Although not fully standardized, the general idea is that the frame relay access device knows the net's committed information rate, which is the average data rate for which the user has paid. If the user sends more than this traffic volume, the DE bit tells the network which frames get priority and which should be discarded first.

Carriers seem to be leaning toward the overprovisioning of frame relay backbones to avoid congestion problems such as frame loss that would irritate their customers. Competition will eventually push up the utilization of the frame relay nodes and trunks, increasing the probability of congestion.

So why not start out with congestion-capable frame relay equipment? Network managers should look for frame relay access devices that can slow down in response to FECN/BECN.

Flanagan is vice-president of technology with FastComm Communications Corp., a Sterling, Va.- based maker of access nodes for analog, circuit-switched and packet-switched networks.

"THE ART OF BEING WISE is the art of knowing what to overlook," said philosopher William James. Be wise; don't overlook the opportunity to write an opinion column for *Network World.*

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TELETOONS

BY FRANK AND TROISE

and another thing . . .

For a couple of years now, we've been hearing about the benefits of imaging. For instance, major banks and insurance companies are using digitized images to maintain extensive databases of canceled checks, insurance policies and even photographs of insured objects such as jewelry or post-collision automobiles.

There have been a lot of stories about how imaging has helped particular companies improve operations. Texas Commerce Bank, for example, used a local-area network-based imaging application to shorten its loan processing cycle from three days to three hours ("Bank's image net helps build business," *NW,* Jan. 13).

Kenwood USA Corp. installed a LAN-based imaging system in response to an edict from top management to move the entire company to a paperless environment ("Firm goes paperless with imaging system," *NW,* Dec. 23, 1991).

Other articles describe imaging as the next great office productivity booster.

In fact, an article in the Forecast 1992 issue of *Network World* sister publication *ComputerWorld* proclaimed 1992 will be a banner year for imaging, with revenues from imaging doubling. The article also predicted that users will experience a 20% savings as well as productivity gains from using imaging to redesign paper-based procedures. This has made imaging the fair-haired child of industry analysts.

With so much happening in this field, you can't afford to miss *Network World's* feature-length look at the technology on June 8. This article will examine what the big users of image networks are doing and how. It will take a look at the technologies required for imaging over LANs and for transmitting images over wide-area networks. In addition, it will explore some of the recently introduced imaging products.

After all, you never know when your boss might insist on using imaging as the latest in an arsenal of strategic technology weapons.

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Putting a new shine on PBXs

The PBX market is in the midst of a prolonged slump that parallels the domestic economic downturn. Customer demand for private branch exchanges has dropped more than 10% in the past two years, with most of the decline occurring during the past 12 months.

Prices have declined along with demand, enabling users in the market for a PBX to benefit from a vicious price war. As prices dropped, many users began viewing PBXs as commodity products that provide basic call processing features and access to public switched network services.

Vendors polish up wares to curb price war, change users' product perceptions.

But the price war and user perceptions aren't stopping vendors from rolling out new products in an attempt to turn things around.

In fact, AT&T next week will formally announce its Definity G3 at ComNet in Washington, D.C., and Rolm Co. has implied it will roll out its 9751 Release 9006 later this year. There are also rumors that Northern Telecom, Inc.'s next major Meridian 1 product upgrade will be announced during the fourth quarter.

Some PBX vendors appear to be calling a truce in the price war and are embarking on campaigns to convince users that their products are worth a few extra dollars. These vendors say that pointing out the strategic call processing applications that their products support will form the cornerstone of these campaigns. Also, vendors will bolster their PBXs by adding advanced capabilities and stronger customer support services such as consulting and systems integration.

The first step in this direction requires vendors to rearchitect their PBXs. While each PBX has its own unique architectural attributes and system parameters, most function similarly.

The majority are based on a multiprocessing system design that includes a main system processor, local cabinet and shelf processors, circuit card processors and peripheral application processors. PBXs typically have processor redundancy options and support a nonblocking switching network, modular cabinets, universal port card slots and a uniform wiring system.

During the next few years, PBX vendors are expected to incorporate major system design changes and new capabilities into their product architectures. These technical innovations will include parallel circuit

(continued on page 38)

Sulkin is president of TEQConsult Group, a Hackensack, N.J., consulting firm.

By ALLAN SULKIN

(continued from page 37)
and packet-switched nets, wideband communications channels on demand, broadband network interfaces and wireless PBX system adjuncts.

PBX packet switching

First on the list of changes is adding packet-switching capabilities to PBXs. All existing PBXs use pulse code modulation, time-division multiplexing (TDM) and circuit switching for transmitting voice and data across the system.

Circuit switching is fine for voice communications, which requires a nailed-up connection for the duration of a voice call. But circuit switching is less than ideal for short, bursty data communications applications. For data communications purposes, packet switching is a better alternative.

An Integrated Services Digital Network-based PBX must, by design, support Basic Rate Interface (BRI) terminal equipment, which has a subsystem to handle D-channel packet signaling and control data.

A PBX system supporting a passive multipoint bus that enables customers to define transmission channels for voice and data also utilizes the D packet-switched subsystem for data communications requiring transmission rates up to 9.6K bit/sec.

The AT&T Definity Generic 2 was the first PBX with an integrated packet local-area network bus system to support ISDN BRI terminals. The Definity's packet LAN bus has been used for the transmission of D-channel packet messages and will also be used for packetized data communications. It operates independently of the system's circuit-switched TDM buses and switch matrices.

Several other PBX vendors are scheduled to support BRI within the next year, including Fujitsu Business Communication Systems, Northern Telecom and Rolm.

An ISDN-based PBX must, by design, support BRI terminal equipment.

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Video to the desktop

While BRI support can provide packet-switched data capabilities to the desktop, PBX vendors will also attempt to increase the amount of circuit-switched bandwidth to the desktop.

Since the development of digital PBXs, station users have been limited to communications channel bandwidths of 64K bit/sec. This was adequate for voice and more than adequate for most data communications, but recent marketplace developments have brought to the forefront the issue of limited PBX bandwidth to the desktop.

Recognizing this dilemma, PBX manufacturers are researching how to multiplex several switching network time slots and associated communications channels in order to support wideband transmission to the desktop. This option will enable a PBX to multiplex several 64K bit/sec channels into a single high-speed channel that can be delivered to the desktop over one cable.

AT&T and Northern Telecom have already announced this option for their central office switches and are expected to bring the capability to their PBXs within the next year or two.

Increased bandwidth to the desktop will bring users into the integrated desktop videoconferencing era. Many leading suppliers are promising systems enhancements enabling support for multimedia workstations that incorporate graphic imaging and full-motion video. For example, Northern Telecom plans to test such terminals at its Richardson, Texas, headquarters later this year.

A few PBXs already support video-switching services using multiplexed transmission channels to a video coder/decoder.

For example, a Rolm 9751 uses two Rolmlink channels, each of which carries 64K bit/sec, to support a 128K bit/sec link to a PictureTel Corp. video codec.

The PBX can pull the two 64K bit/sec channels used to form a 128K bit/sec videoconference from an incoming T-1 line. Those two 64K bit/sec channels are transmitted via separate Rolmlink channels to a PictureTel codec, which multiplexes them to form a 128K bit/sec channel that is fed to the videoconference monitor.

It's unclear whether AT&T's recently announced videophone will work behind a PBX since the carrier has yet to address that issue.

PBX support of multimedia workstations capable of handling voice, data, video, image and graphics will soon be mandatory if the switching system suppliers wish to keep up with the plans of most LAN designers.

Personal computer suppliers, such as Apple Computer, Inc. and IBM, are evolving their desktop computers into all-purpose communications work centers, and PBX suppliers need to support channels greater than 64K bit/sec if they wish to add more peripheral equipment behind their switching systems.

Until there are major improvements in compression algorithms and video signal processing, most customers will not be satisfied with the quality of videoconferencing at 112K or 128K bit/sec.

The need for ISDN HO

Support of acceptable 384K bit/sec videoconferencing transmission will require PBX vendors to provide an ISDN H0 channel capability, which defines how to build a 384K bit/sec data stream, to the desktop.

AT&T, the first domestic PBX supplier to announce H0 trials, plans to begin its tests later this year. A few other suppliers, such as Rolm, have hinted they will follow AT&T's lead.

Multimedia messaging services will also emerge as a significant PBX option later this year. AT&T has already announced a facsimile file server, called Fax Attendant, which can be integrated with its voice mail options. This capability enables callers to retrieve faxes stored in the fax file server when notified by its Audix voice mail system.

Rolm also plans to support integrated voice/text/fax messaging as part of its 9751 Release 9006 announcement. No doubt, Northern Telecom will shortly unveil detailed plans for adding multimedia messaging support to its Meridian Access program.

The multimedia workstation, based on the desktop computer, will be linked to a PBX via a voice terminal equipped with an application program interface (API).

A number of PBX vendors have proprietary APIs. For instance, AT&T offers its PC/PBX Platform, while Northern Telecom has its Meridian Telecenter and Rolm its CallCom. Several others, possibly Siemens Private Communications Systems and Ericsson Business Communications, Inc., may be expected to announce similar options within the year.

The API can significantly increase voice station user productivity by using the power of the desktop computer to simplify and enhance voice communications and processing procedures.

Telephone productivity tools supported by API software packages include user directories, call logs, notes and messages, call screening, and PBX feature or function access using pop-up menus.

The desktop computer as a communications work center, interfaced to the PBX system via the telephone, has virtually unlimited productivity potential.

High-speed interfaces

Vendors will be looking to boost their PBX functionality by adding interfaces to emerging high-speed wide-area services.

Several PBX suppliers have started talking to industry analysts and customers about adding Synchronous Optical Network (SONET) connectivity to their switches.

SONET interfaces will be able to support high-quality imaging and full-motion video applications as well as broadband data communications, especially LAN-to-LAN connectivity.

There are several telephone company SONET trials currently evaluating services and remote fiber-optic terminals (RFOT). An RFOT is customer premises equipment used to multiplex incoming low-speed communications channels into a single broadband fiber-optic link to a remote location such as a SONET-based central office switch. An example of an RFOT is Northern Telecom's Fiberworld Remote Access Node.

The next logical development would be integration of the RFOT into the PBX.

All of the leading PBX suppliers are also leading central office switch suppliers working on SONET-based products. PBX direct connectivity to SONET network services is probably less than two years away.

Suppliers such as AT&T, Fujitsu and Northern Telecom have indicated such a scenario during presentations to industry analysts and at seminars.

PBX direct connectivity to SONET net services is probably less than two years away.

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Even as PBX vendors strive to bolster their products with the above mentioned capabilities, many users are interested in how vendors intend to support wireless communications.

Wireless PBX adjuncts

The all-wireless PBX system is still too far away to be discussed here, but a wireless adjunct system will likely be commercially available by this time next year. The wireless communications system adjuncts that have already been announced link to a PBX via analog connections, although future plans call for digital T-1 links between the adjunct and main PBX (see Figure 1, this page).

The adjunct consists of a control server and distributed base units, similar to antennas, distributed throughout a building. Wireless handsets home in on the closest base unit, which can be as far as 100 meters away. As the station user roams the facility, calls can be handed off among base units.

Each base unit has limited call-handling capacity in terms of simultaneous conversations, and the number of base units per control server is also limited, depending on the system.

Wireless customer premises communications systems are currently being trialed in Europe and Japan, where the governing bodies have allocated usable radio spectrum.

Current wireless communications system prices are about twice that of wired PBX systems. But wireless prices are expected to be cut in half during the next two to three years based on expanding production and the effects of competition.

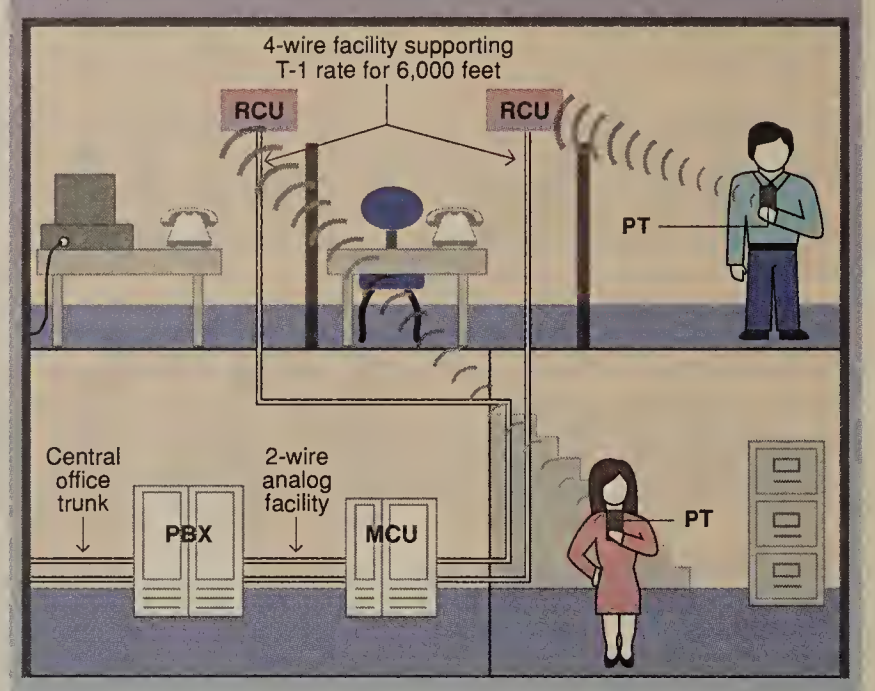
In this country, the only major factor delaying wireless PBX adjuncts is the Federal Communications Commission's reluctance to reallocate frequency spectrum to support the option.

Ericsson was the first to an-

(continued on page 40)

Severing the PBX umbilical cord

Figure 1



MCU = Master control unit RCU = Remote cell unit
PT = Pocket telephone

Wireless PBX adjuncts such as SpectraLink 2000 promise to eliminate the need to hard-wire every office phone to a PBX by enabling PTs to broadcast voice to an RCU, which forwards signals to an MCU linked to a PBX.

GRAPHIC BY SUSAN SLATER SOURCE: SPECTRALINK CORP., BOULDER, COLO.

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(continued from page 38)
nounce a wireless option, the DCT-900, more than a year ago. Since then, several others, such as SpectraLink Corp. and Northern Telecom, have announced plans for a wireless PBX option, while others, such as NEC America, Inc., have merely demonstrated wireless capabilities at trade shows.

System interoperability

Even as PBX vendors work on new capabilities, some customers wonder why they cannot network different vendors' PBXs and obtain cross-system feature transparency and interoperability. After all, they reason, disparate computer systems can talk to one another and support the same software packages.

Unlike the computer system market, where a relatively few major suppliers can establish industry standards, the PBX market consists of many suppliers, each having proprietary hardware and software standards.

In the U.S., PBXs can, and must, interface to the public telephone network but do not communicate with one another at the processor level to provide feature or function transparency across disparate systems.

> A major motivating factor for implementing virtual networks is economics.
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This situation is the result of an open and highly competitive market.

In Europe, where competition has been limited and the post, telegraph and telephone administrations have autonomous standards control, the major PBX suppliers work closely together to satisfy their customer base.

For example, Europe has the ISDN Private Networking System Forum, an attempt to establish PBX interoperability standards.

Suppliers such as Siemens AG, Alcatel N.V., Matra S.A., LM Ericsson A/S, GPT, Ltd. and Philips Industries, N.V. are members of the forum and are cooperating on the development of trunking interfaces and software packages for global networking standards. The globalization of the PBX market may force competitors in the U.S. to cooperate in a like manner.

Siemens, a major force in the European market, is the first North American competitor with plans to introduce a standard networking interface for interoperability between its different products: the Rolm 9751 CBX, Siemens' Saturn PBX, HCM-200 and HICOM PBXs.

The CORNET alternative

CORNET, Siemens networking solution, was first developed for the supplier's European HICOM models and has already been implemented on the North American-developed Saturn product line.

CORNET will be available on Rolm-manufactured CBXs beginning with the 9751 Release 9006.

Although Siemens owns Rolm Systems, Inc., the manufacturing arm for the 9751 CBX, CORNET remains a major research and development accomplishment. Siemens will be able to support its global customer base with a feature-transparent network across different PBX systems in the near future.

There are indications that AT&T and Northern Telecom may support CORNET on their European PBX models, although they currently have proprietary networking options in North America and have not announced plans for CORNET interfaces.

Almost all the leading PBX suppliers have feature-transparent network services utilizing ISDN Primary Rate Interface links.

By using the emerging backbone Signaling System 7-based public network, it will be possible for disparate systems to communicate and interwork with one another in the near future.

The principal drawback to this scenario is the lack of cooperation among suppliers, but customer demand may dictate cooperative R&D efforts.

Virtual private networks

A major industry trend among customers with multisystem networking requirements has been a move away from private tandem networks to virtual private network services such as AT&T's Software-Defined Network, MCI Communications Corp.'s Virtual Network and US Sprint Communications Co.'s Virtual Private Network.

A major motivating factor for implementing virtual networks is economics.

Virtual networks are an attractive alternative for customers that don't have the financial resources or traffic volume to justify and implement their own networks.

The key benefits of virtual networks include flexible network reconfiguration options, compatibility with existing customer premises equipment, usage- and distance-sensitive pricing, network reliability, centralized management capabilities, detailed call accounting reports and minimal customer-required network maintenance and service.

Many customers use virtual network services to complement or supplement a self-operated private tandem network because of the flexibility and low start-up costs of a virtual network service.

A major difference between traditional private networks and virtual networks is that the service is not dependent on the customer premises switching system.

Virtual network customers can easily upgrade or replace their PBXs without upsetting the integrity of the virtual network.

Using a virtual private network affords the customer independence for the choice of a PBX when expanding or changing the network.

Private tandem networks favor a single PBX supplier that enables the user to retain one point of contact and receive the full benefit of PBX interoperability.

Private networks often require the use of midsize to large PBXs regardless of actual customer port requirements because most PBXs under 100 lines cannot be provisioned as tandem network nodes. Virtual networks can satisfy customer locations consisting of only a few station users without the financial penalties associated with installing a complex PBX.

Market outlook

While PBX vendors struggle to add new capabilities and change user perceptions, an oversupply of product will continue to depress PBX prices until at least later this year (see "Step right up and get a PBX deal," this page). At that time, market demand is expected to improve owing to pent-up demand and an anticipated economic upturn.

New system shipments will increase about 2% to 3% during 1992, based on estimates from the TEQConsult Group, a Hackensack, N.J.-based consulting firm. Much higher shipment growth is expected for several aftermarket PBX options, such as voice-messaging systems, voice response systems and call centers, with estimated increases of 10% to 15%.

But until PBX vendors unveil the advanced systems and improved customer services they are now developing, users will benefit from an ongoing price war.

Step right up and get a PBX deal

PBX prices have never been lower, and industry losses may never have been higher than they are today.

Although the current list price for a private branch exchange is about $800 per station, it's not unusual for heavy discounting by distributors to bring the per-station cost for a fully equipped, installed PBX system down to $500 or less.

Compare this to the average list price of $900 per station for a basic installed system 10 years ago, when discounts were not widely offered.

When you consider the rise in the U.S. Consumer Price Index over the years and the fact that today's basic system has far greater performance and standard feature capabilities than those of years past, it's obvious that today's users are receiving more PBX for less money.

Even the discounts available in the early 1980s were not as deep as they are today. Back then, the typical discount was about 10%. Most installed systems today are discounted between 20% and 35%.

Vendors have developed a long list of qualifying discount factors, which include whether the user is a national or major account or is purchasing multiple systems at the same time; whether the user agrees to a multiyear volume purchase or is part of an industry-specific account; and whether the user is purchasing system upgrades.

A growing number of vendors have given area and branch sales managers discretionary discounting authority, compounding the confusion regarding PBX system prices.

There are two primary reasons for the recent rise in discounting: weak market demand and increased competition among major system suppliers and distributors. The former may lessen as the economy strengthens, but the latter will probably not change soon.

The PBX market is dominated by corporate giants, even though the Bell System divestiture was supposed to have increased competition.

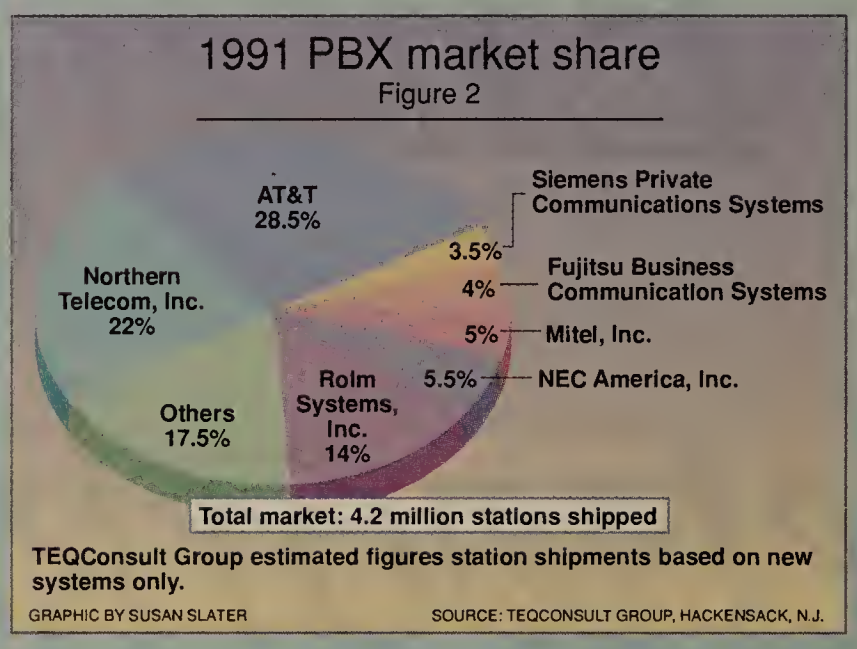
TEQConsult Group estimates that about two-thirds of the total U.S. PBX market is controlled by AT&T, Northern Telecom, Inc. and Siemens Private Communications Systems, including its wholly owned Rolm Systems, Inc. subsidiary (see Figure 2, this page).

These three companies set most of the country's de facto PBX technical standards, performance benchmarks and price levels.

While market demand is down, the low end has been the least damaged. PBXs in the small, under-100-line markets and intermediate, 100- to 399-line markets experienced the smallest drop-off in demand during 1991, compared to the large, 400- to 1,000-line markets and the very large, over-1,000-line markets (see Figure 3, this page).

— Allan Sulkin

1991 PBX market share
Figure 2



TEQConsult Group estimated figures station shipments based on new systems only.

GRAPHIC BY SUSAN SLATER SOURCE: TEQCONSULT GROUP, HACKENSACK, N.J.

PBX line shipments drop
Figure 3

PBX system size	Number of lines shipped (in thousands) 1990	1991
Small (less than 100 lines)	1,255	1,150
Intermediate (100 to 399 lines)	1,460	1,350
Large (400 to 1,000 lines)	670	620
Very large (more than 1,000 lines)	1,200	1,050
Total shipments	4,585	4,170

Figures are based on TEQConsult Group estimates.

GRAPHIC BY SUSAN SLATER SOURCE: TEQCONSULT GROUP, HACKENSACK, N.J.

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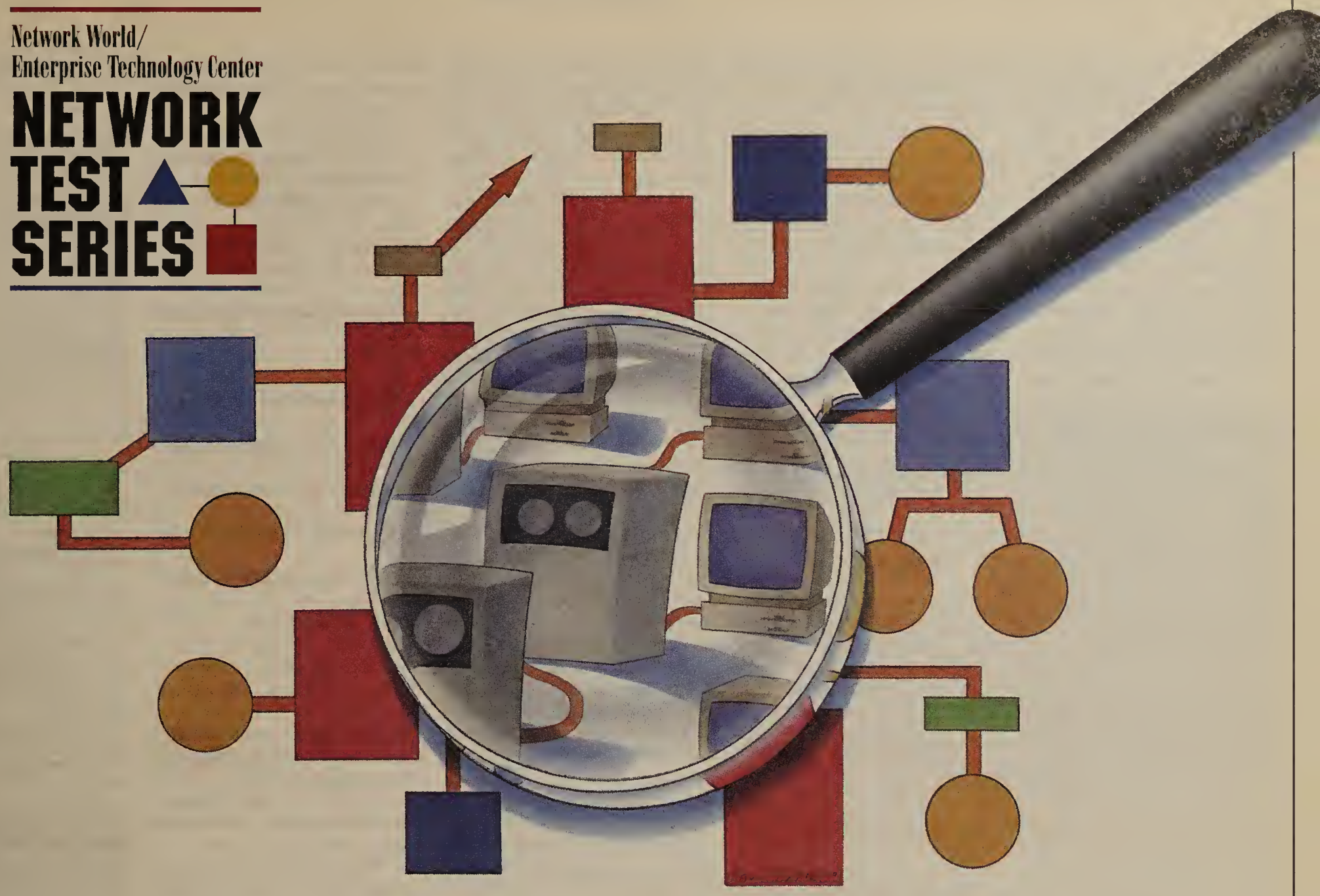


Finding the fastest NOS

CONTINUED FROM PAGE 1

The tests benchmarked Banyan Systems, Inc.'s VINES 4.1, Microsoft Corp.'s LAN Manager 2.0. and Novell, Inc.'s NetWare 3.11. Results rank how the products performed based on different-sized files, disk read/write operations and simulated number of users.

NetWare was fastest when small files of 30K bytes or less crossed the network and the number of users was less than 50. LAN Manager was the fastest for LANs that handled larger files of 80K bytes or more and between 20 and 100 users.

This makes NetWare fastest for small configurations and simple applications such as electronic mail, whereas LAN Manager offers the best performance for varying configurations and bandwidth-intensive applications such as imaging.

Methodology

The test was designed to determine trends in network speed as a function of file size, number of users and changes in read/write ratio, which is the number of times an application running on a workstation requests a file to be read from the server's disk and written to the server's disk. Factors contributing to the speed of a LAN operating system include:

- The time it takes data to travel across the network. For example, because we used an Ethernet network with a maximum throughput of 10M bit/sec, contention is a factor that determines the time it takes for a packet to get on the network.

As more packets pass over the net, it takes longer to find an opening in which data can be transmitted. This is an important issue because the results would have been different if the test had been conducted on a 4M or 16M bit/sec token-ring or Fiber Distributed Data Interface network.

- The network load. In this case, the number of users trying to process requests at any given time.
- The operating system's efficiency measured in the time it takes the server to process a request after it is received.

The test bed for this study included a file server that was con-

(continued on page 44)

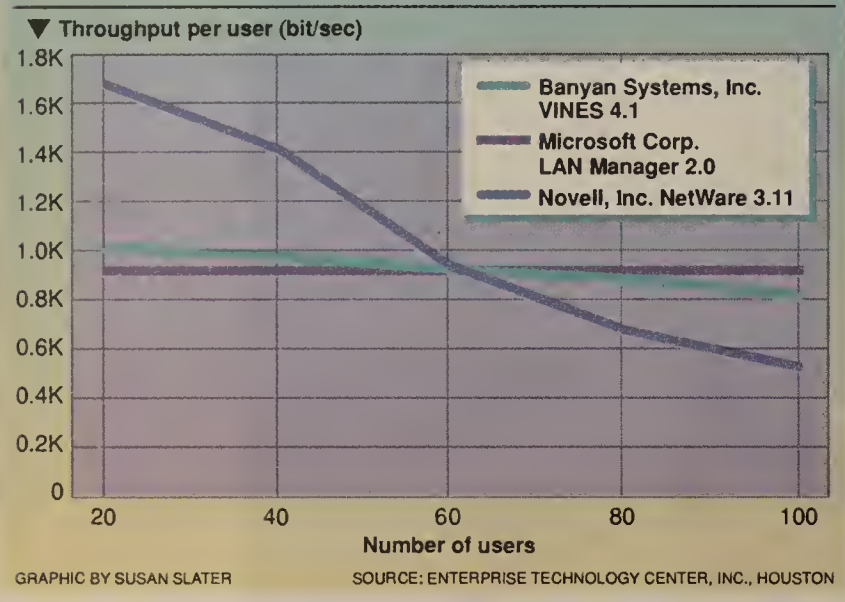
Test shows how LAN operating systems perform by application, work group size.

(continued from page 43)
figured to support five workstations and run the LAN operating systems one at a time. The server was a Dell Computer Corp. Model 433DE system equipped with a 600M-byte hard disk and 16M bytes of random-access memory.

The workstations included three Hewlett-Packard Co. Vectra QS/16S models and two Dell 316SX models, each equipped with 4M bytes of RAM. The server used a Novell NE2000 network interface card, which connected it to a CNet Technology, Inc. CN8000TPC concentrator via thin-wire Ethernet coaxial cable. The workstations were connected to the concentrator via CNet 600E 10Base-T network interface cards and unshielded twisted-pair cabling.

Net performance for data entry applications

Figure 1



GRAPHIC BY SUSAN SLATER SOURCE: ENTERPRISE TECHNOLOGY CENTER, INC., HOUSTON

Test philosophy

The philosophy in this test was to see how the LAN operating systems performed in actual office environments. Each LAN operating system handles requests differently when running various applications. All three use buffers and deferred disk writes in different ways. These factors could have a significant impact on speed.

To examine these variations, a set of tests was designed to explore how the three LAN operating systems behaved under different network traffic loads.

The tests simulated a large number of users on a network by having each workstation send many requests to the server. To sufficiently exercise the four basic tasks of a network — reading, writing, creating and finding files — code was written that performed those operations.

Four file sizes (1K, 10K, 100K and 1M bytes) were used to test the LAN operating systems. These sizes were chosen because they are typical of the size of files commonly transferred in applications running on LANs.

In order to test each LAN operating system, a set of four batch files was created for each file size. Each batch file ran on the workstations and stressed the LAN operating system in a different way. All machines on the network ran the same type of batch file at all times.

These batch files generated network loads corresponding to those generated by real-world situations and instructed the LAN operating system to execute certain functions that included copying:

- The same ASCII files from one place on the server hard disk to another place on the server disk. This provided a 1-to-1 read/write ratio where much of the reading is from memory instead of from the hard disk since the same file is repeatedly being copied.
- The same ASCII files from the server to a dummy device most of the time. One time in 20, the ASCII file was copied back to the disk.

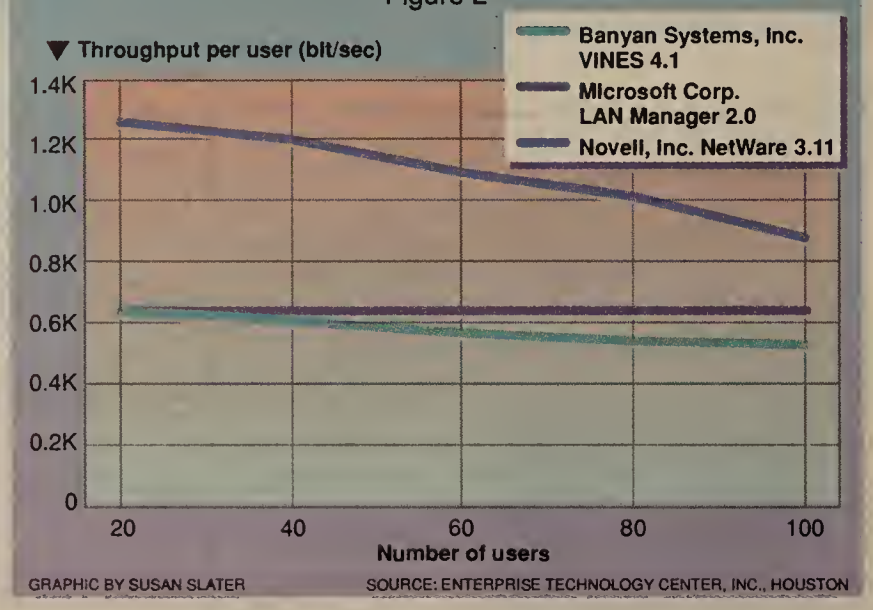
For those familiar with DOS, this is accomplished by issuing the command, Copy Filename NUL:, where NUL: is the DOS dummy device used for testing. This provided a 20-to-1 read/write ratio, where much of the reading is done from memory instead of from disk.

- Unique ASCII files from several areas on the server disk to another area. This provides a 1-to-1 read/write ratio and requires that all of the reading be done from disk rather than from memory.
- Unique ASCII files from areas on the server disk to NUL: most of the time. One time in 20, the ASCII file was copied back to the disk. This provides a 20-to-1 read/write ratio and requires that all of the reading be done from disk.

As these batch files were run on the workstations, they generated traffic on the network. Enterprise Technology Center, Inc.'s (ETC) Enterprise Test Center used a small number of workstations, each making frequent requests to the server, to simulate a large number of "typical" workstations on a LAN. This is a standard way to simulate many users in a test (see "Squeezing 25 workstations out of five," page 45).

Net performance for E-mail applications

Figure 2



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Test findings

The tests showed that LAN operating system performance will vary depending upon the application being run. To get a better indication of how a LAN operating system will perform in a real-world setting, the application must be taken into account.

ETC designed a series of tests that place loads on the LAN approximating the loads that an actual application would place on the server.

The variations in network load were obtained by varying three parameters: file size, read/write ratio and whether the same file on a server was read from memory or different files were read from the disk. Varying one of these three parameters while keeping the other two fixed yielded 16 networking domains, or cases.

The following are eight cases that provide a representative sampling of how the three LAN operating systems perform when processing some typical applications.

- **Case 1:** A 1K-byte file, 1-to-1 read/write ratio and the same file read from the server's disk. Database applications that require a lot of data entry have similar characteristics. These applications use the same files repeatedly.

Because of this, files can be stored in the server's memory and read from memory instead of from the server's disk in order to reduce access time, a process called caching.

In this example, the throughput remained the same as users were added to the network.

NetWare performed the best when 20 users were on the network. It offered about 80% more throughput per user than VINES or LAN Manager when 20 users were active, but this performance level dropped to about 55% of that offered by LAN Manager when 100 users were active (see Figure 1, this page).

> The tests showed that LAN operating system performance will vary depending upon the application being run.
>
> ▲▲▲

VINES and LAN Manager performed about the same for all user levels. The test lab found that both delivered about 1K bit/sec of throughput for each user on the network.

- **Case 2:** A 1K-byte file, 20-to-1 read/write ratio and the same file read each time. These conditions are similar to those generated when performing database queries as well as some E-mail applications.

In this case, the application is doing much more reading than writing. Because it is using many of the same files, this test will measure the server's ability to use caching.

NetWare offers the highest throughput per user in this test. It delivers about twice the throughput per user compared with both VINES and LAN Manager when 20 users are active and about 40% more throughput per user for a net with 100 users (see Figure 2, this page).

- **Case 3:** A 100K-byte file, 1-to-1 read/write ratio and the same file read each time. The application is also using many of the same files repeatedly, allowing them to be cached. In this case, an application such as computer-aided design or a desktop publishing program uses large files and does roughly equal amounts of writing and reading. The 1-to-1 read/write ratio tests the server's ability to do deferred disk writes.

LAN Manager delivered the best performance in this test. It provided throughput of about 22K bit/sec per user with 20 users active. This was about 25% more throughput per user than either NetWare or VINES.

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When more users were added to the network, all three LAN operating systems showed a throughput drop-off. However, LAN Manager remained the best performer throughout, increasing its lead to the point where it was delivering a little over twice the throughput per user of the others for 100 users.

■ **Case 4:** A 100K-byte file, 20-to-1 read/write ratio and the same file read each time. Applications meeting these conditions include large queries in database programs and some E-mail applications where large files are transferred. Such applications do more reading than writing.

Because they use many of the same files, this will test the server's ability to cache. Also, the application simulated in this test uses large files.

The results of this test found LAN Manager and VINES nearly identical with NetWare close behind in performance, delivering about 90% of the throughput per user as the other two LAN operating systems.

> In some cases, NetWare maintains the performance edge; in others, VINES or LAN Manager wins out.
>
> ▲▲▲

ers were active, but its performance dropped off as more users were added. LAN Manager offered about 80% of NetWare's throughput per user with 20 users, and VINES provided about 65% of the throughput compared to NetWare.

For a network with about 50 users, NetWare and LAN Manager delivered about the same throughput per user, while VINES still delivered about 65% of the throughput per user compared to the others.

As more users were added, LAN Manager became the best performer. At the 100-user level, VINES and NetWare offered about the same level of performance and both delivered about 60% of the throughput per user of LAN Manager.

■ **Case 6:** A 1K-byte file, 20-to-1 read/write ratio and a different file read each time. These conditions are similar to those found when linking small libraries in an application development environment and when using some word processing packages. Basically, the application is doing more reading than writing.

Furthermore, it uses many different files, which inhibits the usefulness of caching. The LAN operating system that reads from disk most effectively will excel in this situation.

NetWare was clearly the best performer in this test. For 20 users, it delivered twice the throughput per user compared to LAN Manager and nearly three times the throughput per user compared to VINES. With 100 users, NetWare maintained its performance edge but only by 13% over LAN Manager.

■ **Case 7:** A 100K-byte file, 1-to-1 read/write ratio and a different file read each time. These conditions are similar to those found in imaging applications. There are many different, large files being read from the server's disk.

Here again, as in the other examples with large files, LAN Manager was the best performer. It delivered about 70% more throughput per user (20K bit/sec per user vs. 12.3K bit/sec) than VINES and almost twice the throughput of NetWare for a 20-user network.

When network usage approached 100 users, VINES and NetWare delivered about the same throughput (about 3K bit/sec per user) while LAN Manager was passing data at a rate of 8.5K bit/sec per user.

■ **Case 8:** A 100K-byte file, 20-to-1 read/write ratio and a different file read each time. This test simulated conditions found in some imaging applications and in application development environments where it is necessary to link large libraries of programs. The application is doing more reading than writing.

Additionally, it uses many different files, which inhibits the usefulness of caching. In this case, the LAN operating system that has the ability to transfer large files effectively will perform better.

Again, as in the other large-file transfer tests, LAN Manager outperformed the other two. It offered 33% more throughput per user (19.83K bit/sec per user vs. 14.875K bit/sec) than VINES and NetWare. This was the case when there were 20 users.

The difference in performance grew as more users were added to the network (see Figure 3, this page). When 100 users were attached, LAN Manager delivered more than 2½ times more throughput per user than the other two LAN operating systems.

These tests prove that each application affects the server in a different way. In these tests, we've examined three mutually exclusive conditions: the file size that the application asks the server to read and write, the ratio of reads to writes and whether the same or different files are used.

Categorizing

Although each of these is not constant for a given application, most applications can be classified as falling into one of the categories obtained by varying all three parameters.

Generally, a LAN operating system that writes more to RAM before emptying the RAM to disk will perform well in applications where there are as many reads as writes.

A LAN operating system that makes effective use of caching will do well with applications that use the same files repeatedly. And a LAN operating system that can transfer small files effectively will do well with applications such as E-mail, where the files are small.

These test results show NetWare is the clear winner when small files are used, the number of users on the network is moderate (below 50) and more files are read from the disk than written. NetWare performs well in this situation due to its excellent use of disk caching.

When more users are added, there is no clear winner. In some cases, NetWare maintains the performance edge; in others, VINES or LAN Manager wins out. When large files are in use, LAN Manager is the best performer because it offers more throughput per user than the other LAN operating systems.

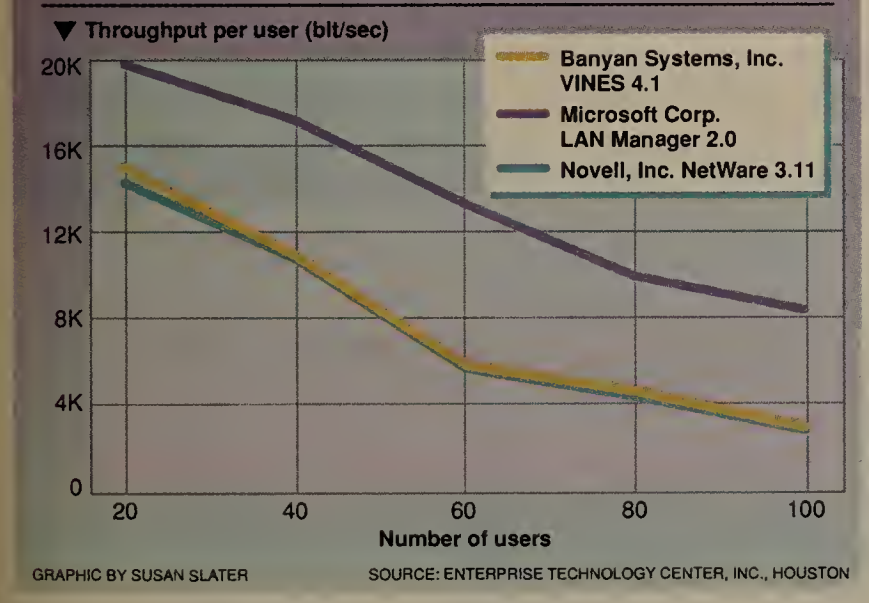
LAN Manager had two additional points in its favor. Its deferred disk-writing capability stores more data in RAM before writing it to disk than NetWare, making it more attractive for applications that require a lot of writing to disk.

And LAN Manager handled larger files more efficiently. NetWare, for example, generated nearly four times as many Ethernet packets as LAN Manager to perform the same task.

Thus, for networks with a large number of users running applications that use large files, NetWare causes a 10Base-T Ethernet to reach saturation much sooner than LAN Manager.

Net performance for imaging applications

Figure 3



GRAPHIC BY SUSAN SLATER SOURCE: ENTERPRISE TECHNOLOGY CENTER, INC., HOUSTON

The tests were conducted by Houston-based Enterprise Technology Center, Inc., which showcases high-end networking and systems integration offerings, conducts research and tests net systems for its clients as well as *Network World* as part of the Network Test Series.

A comprehensive report on LAN operating systems, including the full results of this test can be purchased. For pricing and other information, call (800) 950-5267 and ask for the publications department.

Squeezing 25 workstations out of five

In the local-area network operating systems test, the Enterprise Technology Center, Inc. (ETC) used a somewhat common method for enabling a single workstation to generate the same amount of traffic as a greater number of workstations — the workstations made repeated requests to the server for files, thus generating a large amount of network traffic.

ETC used a Spider Systems, Inc. analyzer to calculate how much traffic each workstation had to generate in order to emulate multiple workstations. It did so by measuring the number of Ethernet packets the server received from a typical user in a set time period and by having a client workstation constantly copying files.

The result showed that one workstation could effectively emulate approximately 25 workstations.

Using this procedure, the number of simulated users was calculated by taking the total number of packets received by the server during the test and dividing that figure by the number of packets received by one background client in the absence of any additional load. Since the latter represents about 25 nodes, this quotient, multiplied by 25, yields the approximate simulated load.

By adding clients, the number of simulated users would increase to a maximum of about 125. But ETC limited the number of users in the test to 100 in order to avoid causing network congestion.

The additional load generated by adding clients degrades network speed because it increases the amount of traffic on the net and forces requests to wait for processing after they arrive at the server.

As long as there is no more than one request waiting in the queue at any one period, the time each user has to wait in order to be serviced remains almost constant. In essence, each request is handled immediately.

When adding users to a network, the net performance per user (in our case, the throughput per user measured in kilobits per second for each user) degrades in a linear fashion. This is because, statistically, the number of items waiting in the server queue is almost proportional to the number of users.

This linear drop-off in performance only holds true to a point. The more users on the network, the more traffic on the physical net cable.

When the physical network nears saturation, the linear drop in performance no longer holds and performance drops off more rapidly. Basically, the space between packets is reduced, so it takes longer to find one of these spaces in which to jump in with another packet.

Because the network queue and physical network both degrade net speed almost proportionally to the number of users, the total network degradation is roughly proportional to the number of users.

This is true for an Ethernet LAN, where saturation occurs at 10M bit/sec and where contention causes performance degradation.

If the test were to have used a token-ring or a Fiber Distributed Data Interface network, the situation would have been different.

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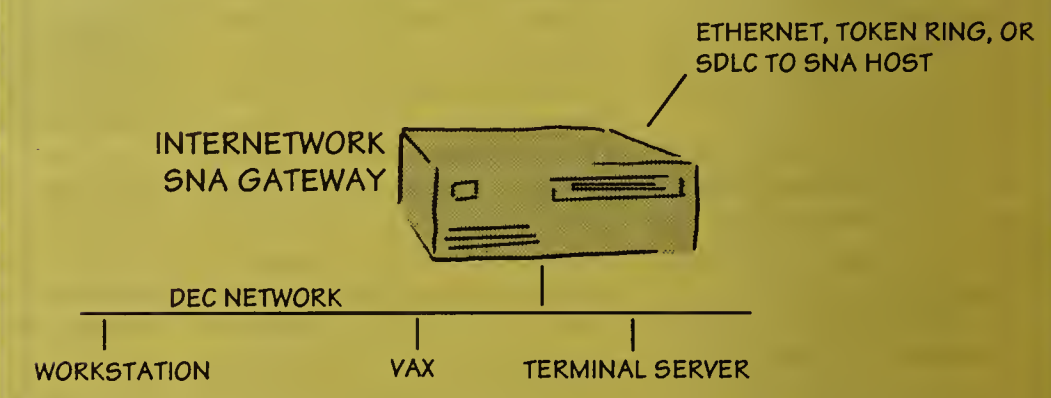

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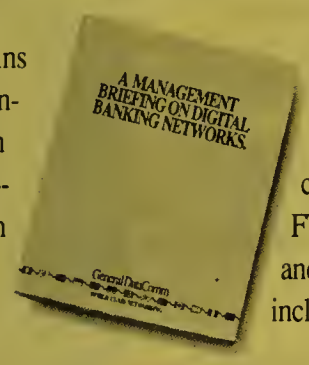

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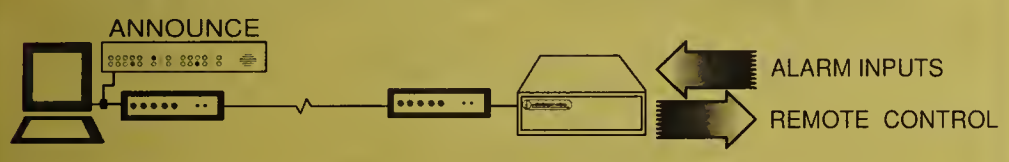

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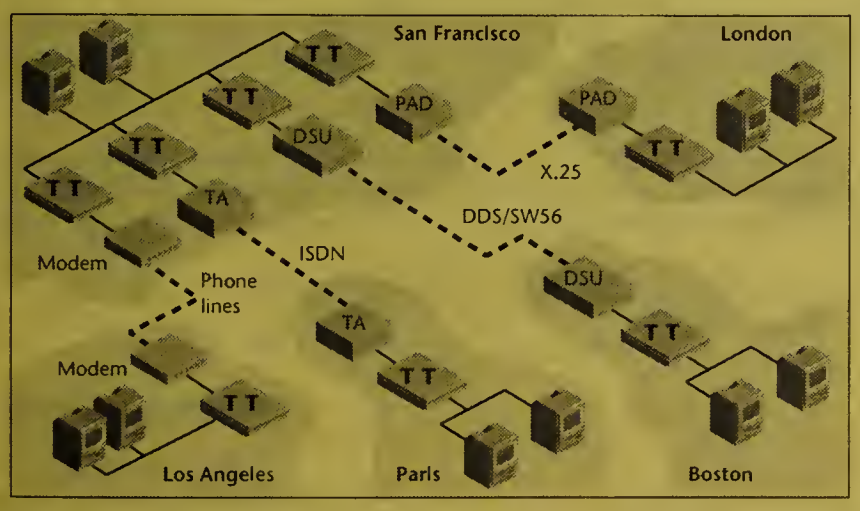

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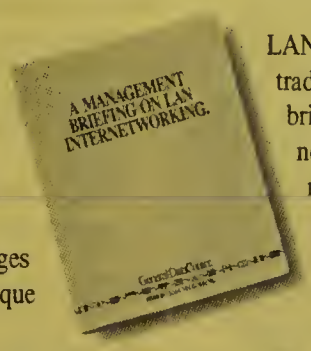

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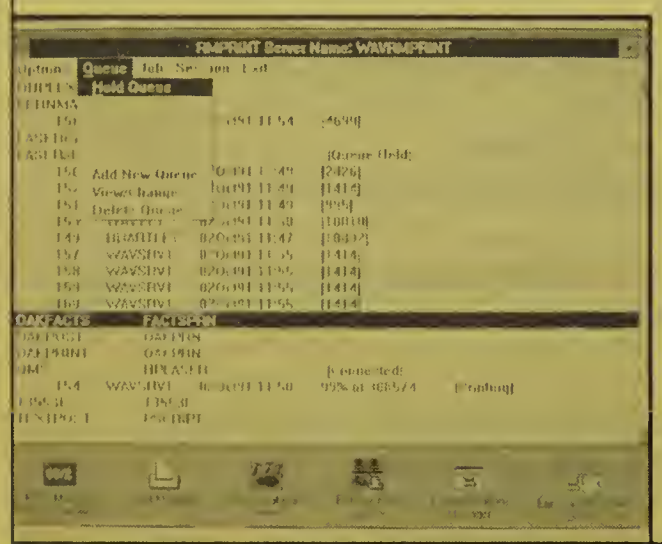

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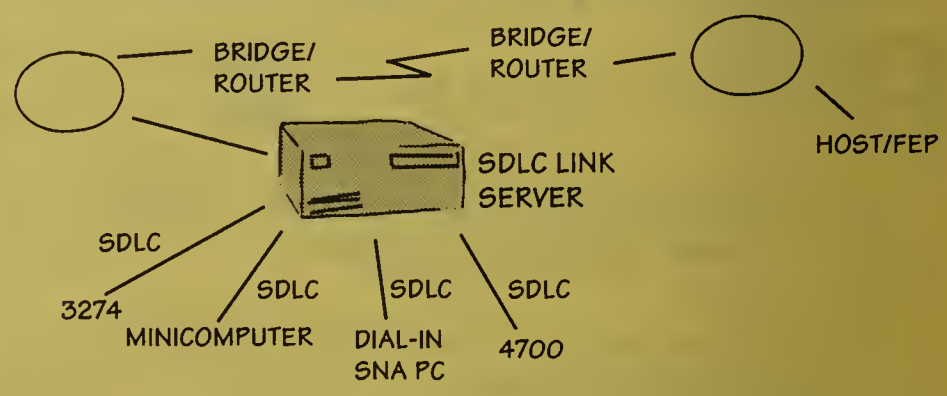

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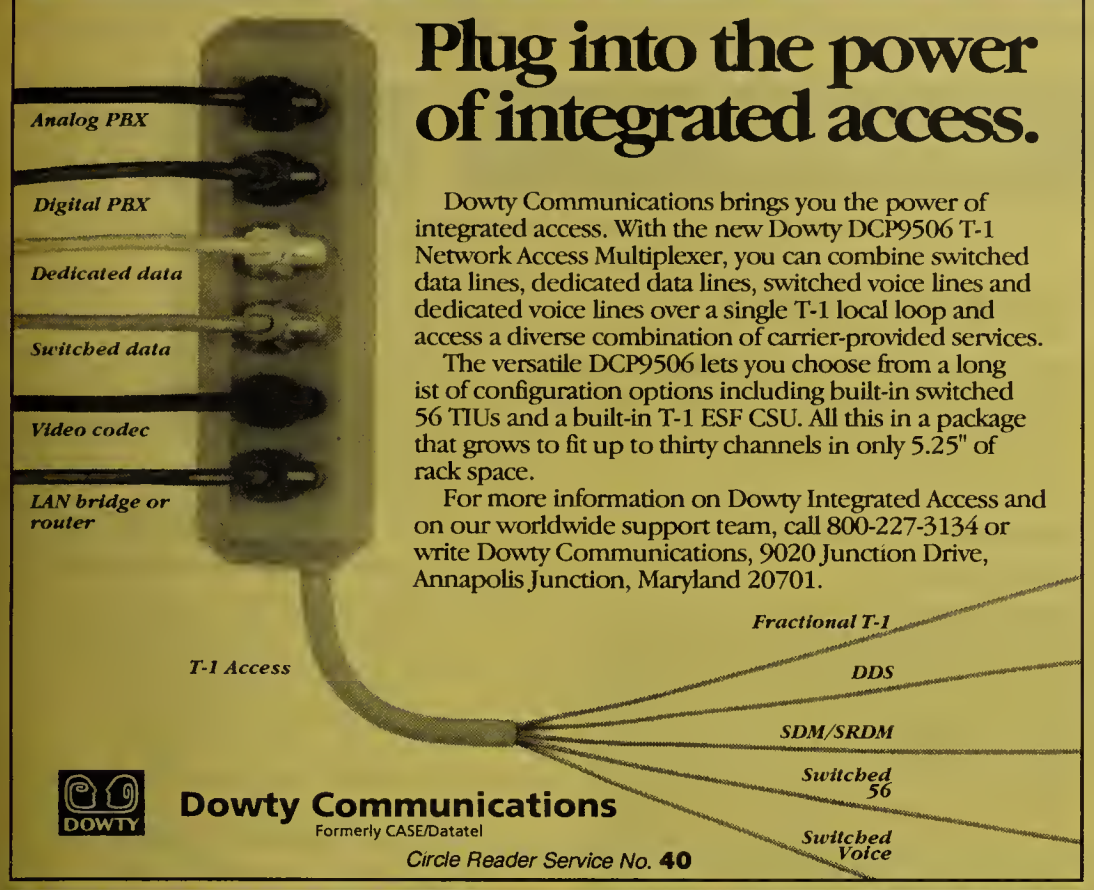

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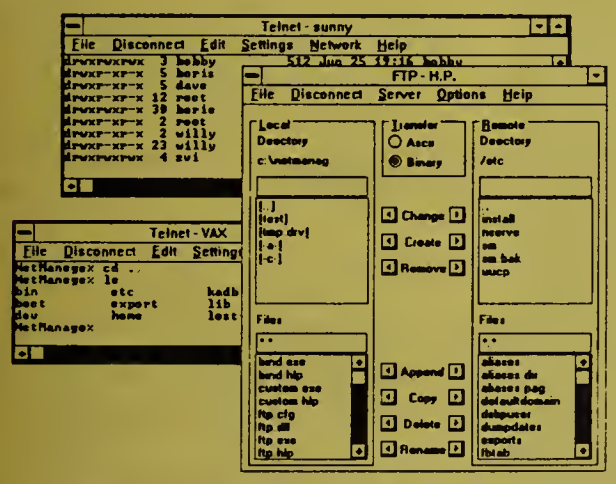

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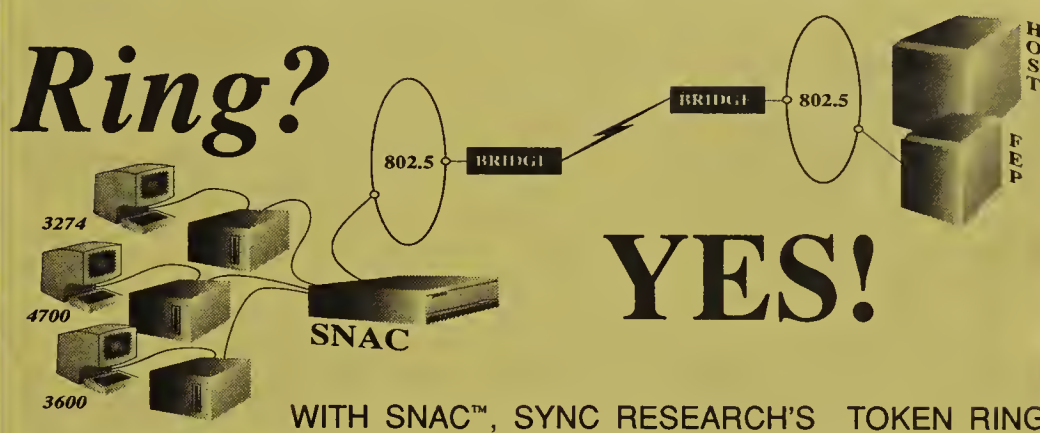

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Feb 3 (Jan 22 Close); Topic: Internetworking; Buyer's Guide: Frame relay

Feb 10 (Jan 29 Close); Topic: LAN; 1. Networking Windows 2. LAN management; Show Distribution: NetWorld Boston; Lead Service

Feb 17 (Feb 5 Close); Topic: Internetworking; Guide To Strategic Purchase Decisions: Outsourcing

Feb 24 (Feb 12 Close); Topic: WAN; ACD options; Lead Service

Mar 2 (Feb 19 Close); Topic: LAN; Buyer's Guide: LAN E-mail (X.400 and otherwise)

Mar 9 (Feb 26 Close); Topic: Global Networks; Selecting an international hub; Show Distribution: DCI Downsizing/Cebit; Lead Service

Mar 16 (Mar 4 Close); Topic: Internetworking; Computer Integrated Manufacturing (CIM) strategies; Show Distribution: ENE '92

Mar 23 (Mar 11 Close); Topic: WAN; Buyer's Guide: Virtual network services; Lead Service

Mar 30 (Mar 18 Close); Topic: Applications; Analysis of the Open Software Foundations's (OSF) DCE and DME; Harvey Study

Firm unveils line of SONET-based muxes

continued from page 2

Transfer Mode (ATM), Switched Multimegabit Data Service (SMDS) and Integrated Services Digital Network.

But the Synchrony STS 300, the first product in the line, will not be available until mid-1993, despite Ascom Timeplex President Dewaine Osman's pledge in 1990 not to announce products until they are nearly ready to ship.

"It was a 'no new taxes' type of thing," said Rosemary Cochran, a principal at Vertical Systems Group, a consultancy in Dedham, Mass. "It certainly does fly in the face of what he said [in 1990]."

Osman said the announcement was in response to customer questions about whether Ascom Group would back Timeplex's long-term TDM strategy.

"We [had] to eliminate doubt about that TDM thrust," he said. "In general, we haven't changed our approach" to announcements.

Some analysts said the announcement was a response to competitors, such as Newbridge Networks, Inc. and Network Equipment Technologies, Inc.'s Adaptive Corp. subsidiary, that laid out strategies for supporting SONET, ATM and other advanced technologies long before products were scheduled to ship.

"They're making sure everyone's aware they're competitive with the people who have announced products," said Doug Gold, director of communications research at International Data Corp., a market research firm in Framingham, Mass.

The Synchrony STS products will be

(continued on page 54)

Upgrade bolsters mgmt. facilities

continued from page 4

had to be triggered by an operator.

MAXM's GUI has been upgraded to support a new Circuit Correlation Window, which graphically depicts the individual components comprising a circuit. Each component has a color-coded status indicator to help the operator determine the source of a problem. From the Circuit Correlation Window, the operator can move directly to other windows that offer more detailed status information or enable the operator to take corrective actions.

Also in the GUI department, ITM has added a capability that enables the status of net components supported by MAXM to be displayed on NetCenter, IBM's GUI for non-Systems Network Architecture devices. From NetCenter, users can issue commands to control non-SNA devices, Thompson said.

Another enhancement is support for dial-up operator consoles. With this feature, operators can dial in to MAXM from a remote OS/2-based personal computer outfitted with MAXM console software. Dial-up users have the same monitoring and control capabilities as directly attached users and can thus handle many net problems remotely, Thompson said.

MAXM Version 2.0 software is available now. It is priced between $50,000 and $200,000, depending on configuration.

Privacy issues loom as global net hurdle

continued from page 27

istrative, technical and physical safeguards" to limit data access only to authorized personnel;

- Provide secure storage and maintenance of personal data;
- Provide individuals with the opportunity to have their names removed from company-maintained mailing lists;
- Allow individuals to verify and correct factual data about them that the company maintains.

As soon as companywide privacy codes have been established or updated, network managers should translate them into concrete policies, procedures and guidelines for design and operation of transborder networks and distributed information systems.

Managers of global networks should also conduct a detailed worldwide inventory of all data — such as business correspondences — held by the company that might be subject to privacy protection.

Companies should evaluate all corporate practices, such as mailing list resale, that enrich or capitalize on holdings of personal information since these practices may encroach on privacy rights.

Network security practices should also be examined to determine whether they provide the appropriate access controls, encryption techniques and physical safeguards for sensitive data files and the networks on which they are carried.

Lastly, telecommunications managers should also establish policies regarding remote monitoring and tracking of employees, customers and others on the network, clearly indicating when such practices serve legitimate business purposes. Advanced telecommunications technologies have a negative side in that they provide the means to check on the activities of people without their knowledge.

Companies should consider the privacy implications of LAN and wide-area network monitoring technologies such as artificial intelligence-based network management systems. The most powerful packages support real-time monitoring of user logons, the applications being used, the files that have been loaded, the information that is appearing on users' screens and the contents of every packet being sent or received over the network.

Firm to air object-based tools

continued from page 2

leases of their products.

DOMS comprises a series of software tools and services that are designed to run on a variety of workstations and servers. For now, DOMS can run on Unix or Microsoft Corp. Windows 3.0 workstations, as well as Data General Corp. AViiON servers and Sun Microsystems, Inc. SPARC-servers running Unix.

The company plans to eventually port the software to IBM's RISC System/6000, among other platforms, according to Bill Robinson, vice-president of development at HyperDesk.

DOMS, through its Object Database and ORB-based application program interfaces (API), gives developers an easy way to build software objects for distributed applications.

It also provides developers with an easy way to create distributed applications because it uses the OMG standard interface to simplify access to software objects on an enterprise network. Developers do not have to deal with the underlying layers of API, remote procedure calls, network protocols and operating systems because they are handled by the ORB.

"Our intention was to let developers concentrate on what they wanted an application to do, rather than how they were going to deal with the transport mechanisms," Robinson said.

DOMS components

DOMS comprises several software tools. The Object Exerciser and the Dynamic Invocation Interface are two client-resident tools based on ORB's API, which provides an interface to the ORB Engine. The engine, which can reside on either a workstation or server, provides the means for client applications to access software objects on other machines.

The software objects reside in the Object Database, which is located on a server. This database contains all objects defined by the developer, as well as Class Libraries, which are HyperDesk-defined objects.

It also contains Interface and Implementation Repositories, which are tools that help developers write and store objects. The Object Database can reside on one server in a network or in several servers scattered across an enterprise.

DOMS also offers a user-authentication service that limits user access to objects. This password-protected access is designated by a system administrator.

In addition, DOMS offers a Location Service, which lists the objects that each user can access as well as their location on the enterprisewide network.

Besides easing the development of new applications, Robinson said DOMS lets developers turn portions of existing applications into reusable objects. This is done by encapsulating parts of the software in an object format and adding them to the Object Database.

This encapsulation mechanism also enables developers to provide access to objects not residing on Windows or Unix systems. If developers want an application to access data within an MVS mainframe, for example, they could encapsulate the required data in an object format. Within that object, they would have to include the mechanisms for accessing the mainframe.

Although this would require more software coding on the developer's part, the newly defined object would only have to be written once and could be reused, Robinson explained.

Available in February, the DOMS developer's kit is priced at $1,995 per user, depending on system configuration. A run-time version, which contains only the user authentication, ORB Engine and Location Service, is expected to be available in June for $495 per user.

Robinson said the run-time version is targeted at end users of applications developed with DOMS. It enables them to incorporate changes to applications on the fly, without having to recompile or relink objects, he said.

HP extends SNMP control

continued from page 1

software, said the agent is desperately needed.

"It's a very desirable product because the traditional SNMP, even with [Management Information Base] II, is not adequate to fully manage a client/server environment," Henderson said. "I consider this a significant breakthrough in the ability to centrally monitor and manage client/server applications."

The agent resides on any HP 9000 Series workstation or server running HP-UX 8.0 or later, or Sun SPARCstation or SPARCserver running SunOS 4.1 or 4.1.1.

Like a traditional SNMP agent, it can communicate information about the objects contained in the SNMP MIB II to either HP's OpenView Network Node Manager software or any SNMP-based management package.

The new agent also allows users to create custom SNMP objects, such as the number of users on a server or the length of a print queue, by defining Unix commands that the agent should execute when a corresponding SNMP query arrives at the node.

When a query arrives at the node, the agent determines if the request is for a standard or custom SNMP object.

If it is for a standard SNMP object, the agent returns a value for that object to the management system.

If the query is for a custom object, the agent executes a simple Unix command designated by the user and returns the correct value to the SNMP manager.

According to Jeff Thiemann, OpenView business development manager at HP, users do not need any programming experience to define objects accessed by the new agent because the commands can be written in any executable or shell script.

In addition, the software comes with more than 60 new SNMP objects, including an object for managing the Network File System file-transfer process and a peripherals object for configuring parameters such as the length of a print queue. Other examples include objects for checking whether a database residing on the server is functioning and to monitor if specific users log on to the system.

The software also includes templates showing how to define new objects. A user, for instance, may need to monitor the number of users on a system to ensure that it does not exceed a certain threshold and introduce performance problems.

A running tally

By editing a file called "snmpd.extend," the user can assign an SNMP object identification number to the number of system users, turning that variable into an SNMP object. Using a template, the user also specifies that a certain Unix command be executed when the "users" object is queried. That command will return the number representing the users currently logged on to the system.

The user then takes the same file containing the new object and adds it to the set of objects managed by HP's Network Node Manager or another management system, just as if it were a vendor-specific MIB object.

Using OpenView's Dynamic Data Collector feature, which constantly polls the various SNMP agents on a network, the user can set a threshold for the number of users. When that threshold is exceeded, it will kick off an alarm that will appear on OpenView's console.

Ginny Mellinger, senior analyst for network management at International Data Corp., a research firm in Framingham, Mass., praised the product for its ease of use.

"In a recent IDC survey of network users, ease of use came out as the most important feature for network management," she said. "I think this announcement speaks directly to that need. Users are looking for some simplification in how to manage all the different segments of the LAN."

Available this week, the Extensible SNMP Agent is priced from $1,000 for a single-system license to $300,000 for a 1,000-system license.

SynOptics airs control tools

continued from page 1

SynOptics will begin shipping LattisWare in the second quarter.

Andrew Ludwick, president and chief executive officer at SynOptics, said LattisWare addresses the shortage of highly skilled workers by enabling lesser skilled operators to handle network monitoring, troubleshooting and diagnosis.

What we really need is an interpreter "so the less skilled operator can look at something as simple as a meter and know what is going on with the health and well-being of the network," Ludwick said. "That wouldn't preclude the more skilled person from digging into the network, but we need something that everybody can use."

Chuck Rush, systems project manager at McDonald's Corp., which recently began deploying the DOS-based LattisWare software in its Oak Brook, Ill., network and soon will be installing the Unix-based version, said members of his staff are already clamoring for more copies of the software.

"The beauty of LattisWare is that it shields the network support staff from the raw data," he said.

New applications

SynOptics' initial LattisWare programs include four Unix-based and two DOS-based applications. The Unix applications are FaultMan, TrendMan, PolicyMan and MeterMan. MeterMan is also available as a DOS program, while the other DOS application is dubbed MIBMan.

The FaultMan application is designed to assist network managers in identifying network faults and figuring out how to address them. FaultMan is the most ambitious of the new applications in that it requires the bundling of several existing products.

FaultMan works by collecting alarms and Simple Network Management Protocol traps from network devices. It then determines whether the alarms need to be acted upon and kicks off a trouble-ticketing system.

The Problem Identifier component of FaultMan uses a rule base to interpret the alarms and traps collected from managed objects. The rule base, which is called the Rule-extended Algorithmic Language, was designed by Production Systems Technology of Pittsburgh. Users cannot write their own rules in the initial release of FaultMan but will be able to do so in a later release.

If the Problem Identifier finds a fault, it passes on the information to FaultMan's trouble-ticketing system, which is based on Remedy's Action Request System. This automates the trouble-ticketing process by alerting network technicians about problems and providing them with an SQL database containing historical references to similar problems.

FaultMan costs $12,995 for a single-copy version.

The SQL database is also used by TrendMan, which stores net performance information and allows network managers to compare current performance against historical performance.

A set of Sybase Data WorkBench reports are provided to allow the analysis of collected data on network conditions such as the utilization rate. TrendMan costs $2,995 per copy.

The next application, PolicyMan, is intended to help save users time by automating tedious and time-consuming net management tasks.

PolicyMan's Partition Manager makes it possible for users to restrict access to portions of the network by blocking usage, for example, of nodes in a certain department after a particular time of day.

The software's Threshold Manager enables users to set thresholds for multiple SynOptics network devices at the same time so that when a threshold is exceeded, the manager is notified automatically. Thresholds regarding network conditions such as errors can be set for hubs, as well as ports, backplanes and other network objects.

MeterMan, available for Unix and DOS environments, collects Management Information Base (MIB) data from SynOptics and third-party network devices and presents it in the form of a meter similar in looks to a car speedometer. The meter gives the net operator a quick look at the status of various network conditions, such as usage levels and error rates, compared with their norms.

The Unix-based MeterMan comes bundled with PolicyMan and costs $1,995 for a single-copy version. The incremental fee for a distributed version designed to run on SynOptics' Reduced Instruction Set Computer-based Network Control Engine hub modules is $995.

Finally, MIBMan is a DOS application that shields network operators from raw SNMP MIB data by presenting MIB data from SynOptics and other gear in a format predefined by the user, such as a graph or spreadsheet.

The DOS-based MeterMAN bundled with MIBMan costs $995.

The pricing for the whole product suite, in fact, is very attractive, users said.

"It's a bargain," said Chris Yates, head of telecommunication services at National Power PLC, a large SynOptics user based in the U.K. "The software should pay for itself in just a few weeks."

McDonald's Rush agreed. "They're practically giving it away," he said. "It's going to be hard for customers not to try it."

Bellcore unveils ISDN forecast

continued from page 4

chairman of the California ISDN Users Group, said the new report would be very useful.

"For the first time, we can start planning our networks because we know where the ISDN switches are located," he said. "But what is missing from the report is information on Basic Rate Interface and Primary Rate Interface [availability]."

In assembling the report, Bellcore also asked the RBHCs for their implementation plans for two versions of Signaling System 7 (SS7), one that supports voice-only ISDN and one that supports full-ISDN voice/data capabilities.

Most of the RBHCs released data on switch support for the so-called SS7 TR394 specification for voice-only ISDN. Bell Atlantic reported that 50.7% of its ISDN switches would have SS7 TR394 in 1994. BellSouth reported 100% in the same time frame, while Nynex said 100% and Southwestern Bell 91%. Pacific Bell reported 92% of its IDSN switches would support SS7 TR394 functionality by 1993. US West, Inc. and Ameritech did not release figures.

Bellcore said it is still collecting information on RBHC plans for voice/data SS7 TR444. These figures will probably be available in the next report.

The report can be obtained by calling (800) 521-2673.

RBHC ISDN deployment data

Company	Millions of lines that will support ISDN			
	1991	1992	1993	1994
Ameritech	2.2	3.3	8.1	11.1
Bell Atlantic Corp.	6.9	14.8	15.8	17.1
BellSouth Corp.	3.1	5.6	8.0	10.5
Nynex Corp.	1.3	3.9	5.3	5.4
Pacific Telesis Group	4.1	4.7	5.8	7.5
Southwestern Bell Corp.	1.6	2.0	2.1	2.2
US West, Inc.	3.7	6.0	7.6	8.0

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: BELL COMMUNICATIONS RESEARCH, LIVINGSTON, N.J.

Firm unveils SONET muxes

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compatible with the company's Link+ T-1 muxes, allowing users to preserve investments in Link+ products while migrating to broadband technology.

Synchrony STS muxes will be based on a multibus SONET/SDH backplane with a total capacity exceeding 600M bit/sec, said John Christmann, product manager for Synchrony STS. The muxes will include four other key components: Interface Elements, Service Elements, Control Elements and an ATM Element.

> Ascom Timeplex has not committed to a time frame for delivering the ATM Element.
>
> ▲▲▲

Interface Elements provide physical access to network devices and carrier services. Individual modules will support links to low-speed serial data channels, a High Speed Serial Interface, T-1/E-1 and T-3/E-3 facilities as well as SONET/SDH links.

Service Elements handle switching for various specialized types of traffic. Ascom Timeplex plans to offer modules for frame relay, ATM, SMDS and ISDN.

The company will also offer a module that enables a Synchrony STS to act as a peer in a network based on Link+ muxes, meaning it can recognize proprietary Link+ internodal formats, Christmann said.

Control Elements manage bandwidth allocation among Interface and Service Elements. Included is a SONET Matrix Module that supports connections between 150M bit/sec SONET/SDH buses to create a total capacity of over 600M bit/sec.

The ATM Element is a separate, busless matrix switching module that extends the total internal switching capacity of a Synchrony mux to 2.4G bit/sec.

Ascom Timeplex has not committed to a time frame for delivering the ATM Element. "It's really going to be driven by market requirements," Christmann said. The company has also not yet selected an ATM chipset.

The Synchrony STS 300 will support a 300M bit/sec SONET-based bus, six T-3/E-3 trunks, 192 T-1 or 144 E-1 trunks and 512 data ports. It will be mesh-networkable and priced from $100,000 to $300,000.

By contrast, Ascom Timeplex's previously announced TX3/SuperHub T-3 mux ranges in price from $30,000 to $80,000. According to Christmann, that product would be used primarily as an M-13 mux by users interested solely in aggregating multiple T-1s onto T-3 links.

US West teams up with Ascend

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interexchange carriers recognized the bandwidth-on-demand services market, and this will be the year the BOCs recognize it."

US West Communications customers will also be able to use Ascend's Multiband Bandwidth-on-Demand Controller to dial up any long-haul carrier's switched 56K bit/sec service via an Integrated Services Digital Network Basic or Primary Rate Interface line or T-1 access link, Helfrich said.

Helfrich said he hopes the new agreement will be the first of many with local carriers. Ascend already has an OEM accord with US Sprint Communications Co. and has signed comarketing pacts with AT&T and MCI Communications Corp.

"Customers don't want to buy from us, Promptus [Communications, Inc.] or Digital Access Corp.," Helfrich said. "Customers want to buy services [from carriers]."

Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy, said the Media-Conferencing service is a sign that the RBHCs are finally moving forward in offering users an easy way to tap higher speed switched digital access lines.

NETWORK WORLD

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Firms plans to fold SNA traffic

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The key features Cisco will add to its routers include local timing acknowledgments required by SNA, as well as media conversion software that will allow communications between serial and token-ring media types.

The company also announced support for IBM's LAN Network Manager and NetView, in addition to two new bridging algorithms (see "Cisco revises SNA strategy," this page).

Simone said existing bridge/routers simply are not sophisticated enough to mimic SNA's inherently hierarchical structure.

"Today, we run parallel bandwidth to our sites — 56K bit/sec lines for our routable traffic and a 19.2K bit/sec line immediately alongside it for our SNA traffic," Simone said. "We'll realize exorbitant savings once we're able to carry both types of traffic over a single backbone network."

Simone added that a full PU 4 implementation on a Cisco bridge/router would actually be a drawback because it would require Motorola to get involved with the elaborate and tedious System Generation process used to configure PU 4 devices.

The Local Acknowledgement feature Cisco announced last week will allow the router to provide acknowledgments required by SNA. By allowing a Cisco router to terminate Logical Link Control 2 (LLC2) timers and acknowledge packet receipt on behalf of the remote device to which the packet is destined, Simone said this would obviate the need for acknowledgment data to be sent over wide-area links. It would also keep SNA sessions alive while the router finds a new data path.

Finding a new path

"There's been a problem with running LLC2 traffic over the wide-area network or even a large local-area network," Simone said. "The LLC2 protocol was never designed to be run in a large wide-area net so, as a result, we've had trouble with time-outs that cause [SNA] session loss."

Previously, the only way to address the problem was to alter the topology of the net in order to lessen the delays or to tune the parameters in each net node.

"Neither of these methods are easy or even desirable, and neither really solves the time-out problem," he said. "It just masks it for a bit longer so you can grow your network a little further."

According to Simone, the Local Acknowledgement feature, which Cisco will make available by spring, fundamentally solves the time-out problem and reduces the risk of SNA session loss by terminating the timers at the local router.

"We no longer have polling or explorer traffic traversing the wide-area line, so [the feature has] given us more efficient use of our bandwidth," he said. "In addition to getting better performance, we've also achieved greater reliability over our SNA sessions."

The second key change Cisco announced is a feature that will allow its routers to support local termination of SNA sessions for Synchronous Data Link Control and token-ring traffic. This new feature, expected by year end, promises to further reduce the amount of SNA background data sent over wide-area links.

The SDLC-to-token ring conversion, called SDLLC, permits communications between mixed serial and token-ring media types. The router performs conversion between IBM devices on token-ring LANs and IBM devices attached to serial lines, translating between LLC2 and SDLC.

A token ring-attached front-end processor, for instance, can now communicate with a serial-attached cluster controller, despite the fact that each is connected to a different medium running a different protocol.

Simone said the main advantage of the SDLLC software is that it will enable him to significantly reduce the number of serial ports required.

"With far less hardware, we can now migrate a lot more of our SNA devices onto the internet backbone," he said. "We no longer need to provide serial ports on all of our routers every time there's a cluster controller or front-end processor connection."

Cisco revises SNA strategy

MENLO PARK, Calif. — As expected, Cisco Systems, Inc. last week announced a revised plan to support SNA traffic along with local-area network traffic on router-based internetworks.

Cisco announced enhancements that keep Systems Network Architecture sessions active even during a network link failure as well as a media conversion feature that enables token ring-attached devices to easily communicate with IBM devices attached to serial lines.

Cisco also introduced support for source routing transparent (SRT) bridging, translational bridging between source routing and transparently bridged networks, as well as support for IBM's LAN Network Manager and NetView.

Beginning in March, Cisco will support SRT bridging, an emerging IEEE standard that allows a bridge/router to handle source routed and non-source routed traffic concurrently — rather than using a different bridge/router and separate communications line for each.

Cisco will also incorporate an IBM 8209-like translational bridging capability into its router software, providing support for bridging between Ethernets and token rings.

The router will essentially act as a gateway between source routing bridges and transparent bridges, either by stripping the Routing Information Field (RIF) from a token-ring packet for transmission to an Ethernet node, or by inserting a RIF into Ethernet data for transmission to a token ring.

Cisco also announced support for LAN Network Manager, IBM's token-ring network management software. A Cisco router can now pass data to LAN Network Manager, enabling the router to monitor any token ring attached to it.

Cisco also announced bi-directional connectivity between its NetCentral network management system and IBM's NetView, which will enable network administrators at NetView consoles to manage Cisco routers and other SNMP devices.

In addition to allowing users to capture data, such as SNMP traps and events, from Cisco routers and other non-SNA devices, the NetView interface will let users issue commands to those devices.

All five features will be available in March as part of the bridging software option for Cisco routers.

The software is priced between $450 and $1,800, depending on the router.

— Maureen Molloy

Microsoft enhances server

continued from page 4

the inventory of a particular item falls below a certain threshold.

Microsoft said ODS builds on an earlier announcement of its Open Database Connectivity (ODBC) application program interface, which provides heterogeneous database access from a Windows client.

"With ODBC providing database access at the front end and ODS providing back-end support for various data sources from SQL Server, we are providing an open interface at every level," said Dwayne Walker, director of marketing and business development at Microsoft.

In the area of new gateways, Microsoft added SQL Bridge, which links its SQL Server and co-developer Sybase's Unix and minicomputer databases.

With SQL Bridge, Microsoft SQL Server users can access data on Sybase databases, and VAX, Apple Computer, Inc. Macintosh and Unix clients with Sybase's Open Client interface can get data from Microsoft's SQL Server.

Microsoft also introduced Gateway Link, which provides an interface between OS/2 and Unix and DEC VMS environments.

Using Gateway Link with SQL Solutions' existing Gateway Services minicomputer database gateways, SQL Server applications can access DEC's RMS as well as databases from Informix Software, Inc., Oracle Corp. and Ingres, an ASK company.

Finally, Microsoft introduced new SQL Server Programmer's Toolkits for Visual Basic, C and COBOL to assist developers in building graphical client/server applications. Each kit costs $495.

"What Microsoft has accomplished is very impressive. Not only has Microsoft made its SQL Server more competitive, it can now be viewed as the preferred database solution," said Aaron Zornes, vice-president of the META Group in Westport, Conn.

According to Tony Percy, vice-president of software management strategies at Gartner Group, Inc. in Stamford, Conn., "Until this release, Microsoft didn't have the connectivity pieces in place. This announcement makes it a much stronger product."

Microsoft said the new release and related products will be available by the end of the first quarter. Current uers can upgrade to SQL Server 4.2 at a cost of $595 for a 10-user system and $1,595 for an unlimited-user system.

FCC to demote microwave users

continued from page 1

people to use small, wireless devices to communicate with remote telephone systems or data devices.

Microwave users, many of whose networks support utility and remote monitoring applications, have expressed outrage at being moved and fear that moving to higher, less reliable frequencies could jeopardize network performance.

Christine Gill, a Washington, D.C. attorney who represents a number of corporate microwave users said that, despite giving users a transition period and allowing some to stay indefinitely, users, will still be hurt. It will be difficult for users to maintain networks in the current spectrum because "manufacturers don't want to continue marketing products in these frequencies because they see the handwriting on the wall," she said.

Users will have to put up with a number of new users operating in their spectrum. "It's a little like buying a condo and finding out that the building is putting discos in all the apartments around you," she said. Tenants can stay, but it obviously will not be very pleasant, she added.

One reason that the 1.8-GHz to 2.2-GHz band was selected is that Canada, Japan and several European countries have allocated this same frequency for new wireless services. In order to ensure international equipment and service compatibility, the U.S. must set aside the same spectrum, according to Stanley.

FCC officials acknowledged that the decision to displace microwave users is highly controversial but said they have struck a fair balance and will not turn their backs on the users who are forced to move.

"We need to demonstrate exquisite sensitivity to displaced users," said FCC Commissioner Ervin Duggan at a meeting here last week. "We have a heavy burden in considering displacing a proven use of the frequency for a speculative use."

The full text of the FCC's proposal will not be issued for several weeks. But at the meeting, FCC officials sketched out the major provisions of the proposed rules.

All current microwave users will be allowed to stay on their current frequencies for 10 to 15 years as co-primary users, which means that any new techology provider coming onto the frequency would have to work around the existing microwave user and provide protection from interference. Public safety microwave users will be allowed to remain as primary users indefinitely. During this interim period, microwave users cannot expand their existing network.

At the end of the transition period, microwave users who remain in the 1.8-GHz to 2.2-GHz band will be demoted to secondary user status, meaning they will lose their protection from interference from new primary users.

FCC officials said they are hopeful that entrepreneurs for new services such as PCN will be willing to buy out existing microwave users in order to become sole primary users immediately.

However, microwave users say that FCC efforts to help them with the move are inadequate. Gill said she is skeptical that new providers will make a good-faith effort to buy out existing microwave users because they can just wait until the end of the deadline and get spectrum for free.

Capt. Bud Wenke, commander of communications for the Los Angeles County Sheriff's Department, said that he is pleased that public safety users can stay in their current bands, but he is concerned about an inability to expand their networks.

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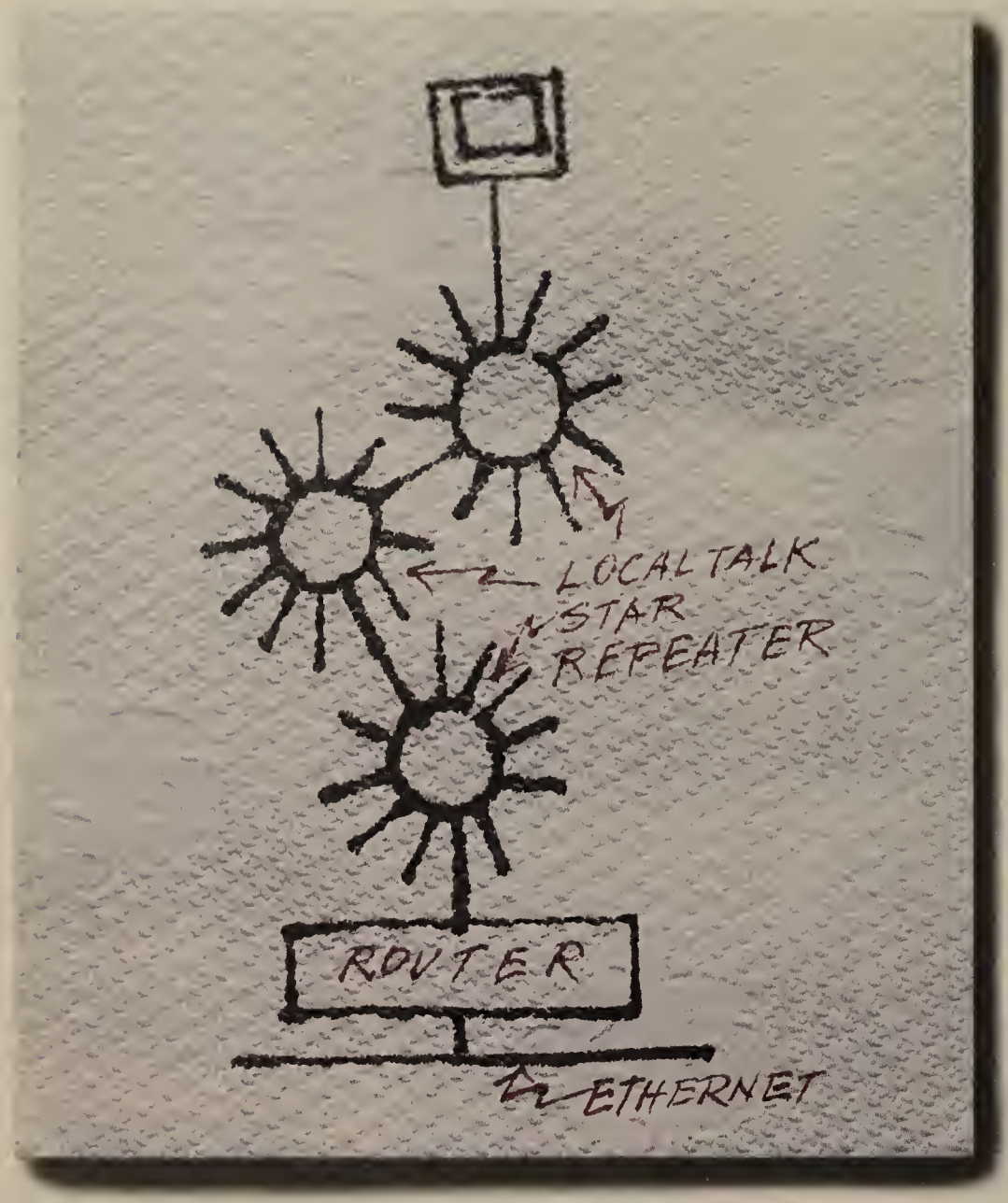

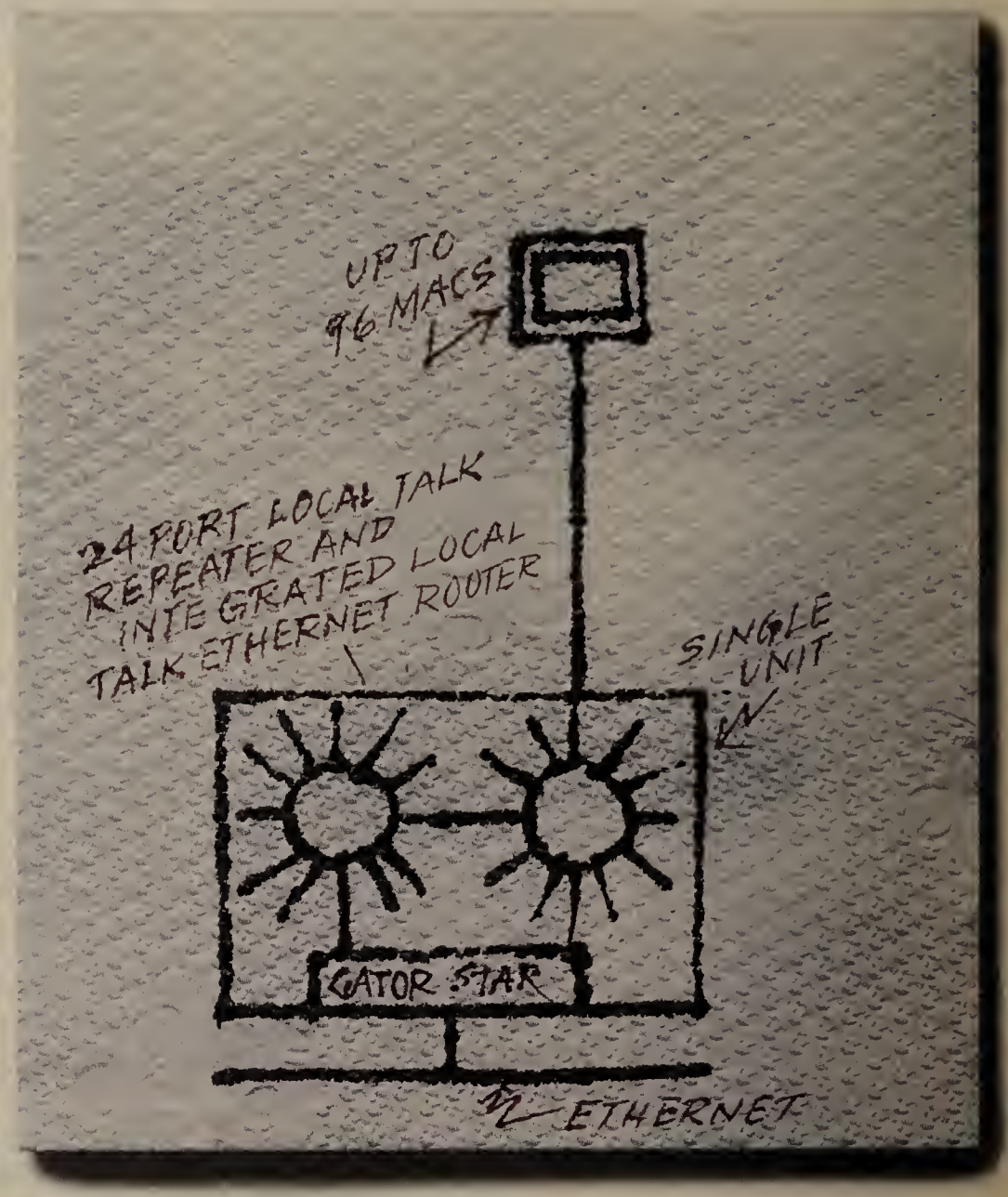

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